Determining individuals' response to New Zealand biosecurity

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The effectiveness of biosecurity measures at national borders is influenced by the behaviour of individuals. One influence on the behaviour of individuals is level of involvement. Involvement is the importance or relevance of an object or situation to an individual. Involvement helps regulate the way in which people receive and process information and thus influences the extent of information searching for decision making, information processing and persuasion. A second area of influence on individuals is the way in which information is framed. Framing influences the persuasiveness of communications. In this study the concept of involvement was used to investigate the response of individuals to New Zealand biosecurity requirements and the response of individuals to differently framed biosecurity information. A range of people associated with the agricultural and food processing sectors were surveyed using a five item scale of involvement to measure their level of involvement in biosecurity. The results indicated that most respondents had medium to high levels of involvement. This implies that respondents were motivated to attend to and process information on biosecurity measures. However, not all respondents reported taking note of biosecurity information implying that involvement with biosecurity prompts some initial

information processing which may or may not continue over time. Respondents were also asked to rate four postcards, each designed with a different message strategy. Individuals with high involvement indicated that the postcard with the negatively framed emotion/entertainment message strategy was most persuasive. The results indicate that specifically targeting information to individuals based on their level of involvement in biosecurity may increase compliance with biosecurity measures.

Key words: Behaviour, involvement, biosecurity, information processing

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"*Biosecurity is the exclusion, eradication or effective management of risks posed by pests or diseases to the economy, environment and human health*" (Biosecurity Council, 2003, p. 5)

1.1 Introduction

The New Zealand biosecurity system has been designed to exclude, eradicate or manage the risks posed by pests or diseases to the economy, environment and human health (Biosecurity Council, 2003). Historically New Zealand's geographic isolation helped exclude unwanted exotic species from entering the country, however, increased trade and travel has resulted in a corresponding increase in the risk of biosecurity incursions (Goldson, Rowarth, & Caradus, 2005; Hall, 2005; Jay, Morad, & Bell, 2003; Kriticos, Phillips, & Suckling, 2005). The impact of human-mediated accidental and deliberate introduction of exotic species is considerable (Andreu, Vilà, & Hulme, 2009; Brasier, 2008; Mack *et al.,* 2000; Tatem & Hay, 2007; Vitousek, D'Antonio, Loope, Rejmánek, & Westbrookes, 1997). Kriticos *et al.* (2005) estimated that, with no improvements to the biosecurity system, New Zealand would have to deal with 542 potential pest incursions between 2005 and 2017. Taking into account direct impacts and ongoing control costs this would cost the economy NZ$921 million (Kriticos *et al*., 2005). Further, Kriticos *et al.* (2005) estimated that improving the rate of detection and interception of exotic species at the border by 10% would reduce expenditure on incursions by $16 million over the same time period.

1.2 An overview of the New Zealand biosecurity system

From the late 1800s the government has sought to protect New Zealand's primary industries from invasive species (Jay & Morad, 2006). To that end, New Zealand has developed a

biosecurity system, currently based on a Biosecurity Act, introduced in 1993; a Biosecurity Strategy, released in 2003 and endorsed by government; and a lead government agency, The Ministry of Agriculture and Forestry (MAF). The 1993 Biosecurity Act amalgamated several different Acts all relating to biosecurity (Webb, 1995). The stated purpose of the Act is to eradicate and manage unwanted organisms already in the country and to prevent other unwanted organisms from entering (Storey & Clayton, 2002). The Act outlines the roles of importers, landholders and MAF (Webb, 1995). The Act also specifies that the public have a duty to report notifiable organisms, and that individuals coming into New Zealand are required to declare any biosecurity risk goods they may have in their possession (Webb, 1995).

The development of New Zealand's biosecurity strategy followed several unfavourable reviews of biosecurity in New Zealand; see for example Parliamentary Commissioner for the Environment (PCE) (2002). The PCE report acknowledged the strengths of the New Zealand biosecurity system, and highlighted a number of strategic, process and operational weaknesses, including the need to increase public awareness of biosecurity and the need to develop strategic directions for biosecurity. The biosecurity strategy proposed an overall direction and a set of expectations for New Zealand's biosecurity (Biosecurity Council, 2003). The overall expectation is "*that the biosecurity system is fully integrated, operating efficiently and transparently in an environment of continuous improvement (measure, review, refine)*" (Biosecurity Council, 2003, p. 11).

MAF is the government agency responsible for biosecurity. In 2004 a new division within MAF was established – MAF Biosecurity New Zealand (MAFBNZ). MAFBNZ's role is to lead biosecurity efforts within New Zealand (Biosecurity New Zealand, n.d.). Biosecurity

New Zealand is responsible for a range of tasks including the establishment and enforcement of policies, standards and regulations.

The New Zealand biosecurity system is characterised in Figure 1.1. It is considered to be one of the most comprehensive in the world (Loope, 2004; Meyerson & Reaser, 2002). There are a range of measures employed to reduce the number of biosecurity incursions. These include pre-border measures such as checking and treating imported goods in the country of origin, border control measures, and post-border surveillance programmes (Jay *et al.*, 2003). People are present at all points in this system, from pre-border to post-border. Their behaviour, in response to the measures outlined above, will determine whether biosecurity risks can be easily managed. Their response to particular measures will depend on a range of factors, including their perception of biosecurity (Mack *et al.,* 2000; Tatem & Hay, 2007). McCullough, Work, Cavey, Liebhold, and Marshall (2006) who studied the records of biosecurity incursions in the USA found that over half of all interceptions were associated with baggage carried by members of the public when travelling into the country. Individuals coming into New Zealand have also been identified as a biosecurity risk (Forer & McNeill, 2008). Therefore, understanding individuals' perception of biosecurity is critical to effectively managing the risk of biosecurity incursions (García-Llorente, Martín-López, González, Alcorlo, & Montes, 2008).

1.3 The provision of information on the New Zealand biosecurity system

Currently all individuals who arrive in the country by air, i.e. returning New Zealanders and other travellers, are provided with detailed information on New Zealand biosecurity in one or more of the following ways: the New Zealand passenger arrival card, a video shown on board

most inbound international aircraft and/or a pamphlet detailing the requirement to declare risk goods.

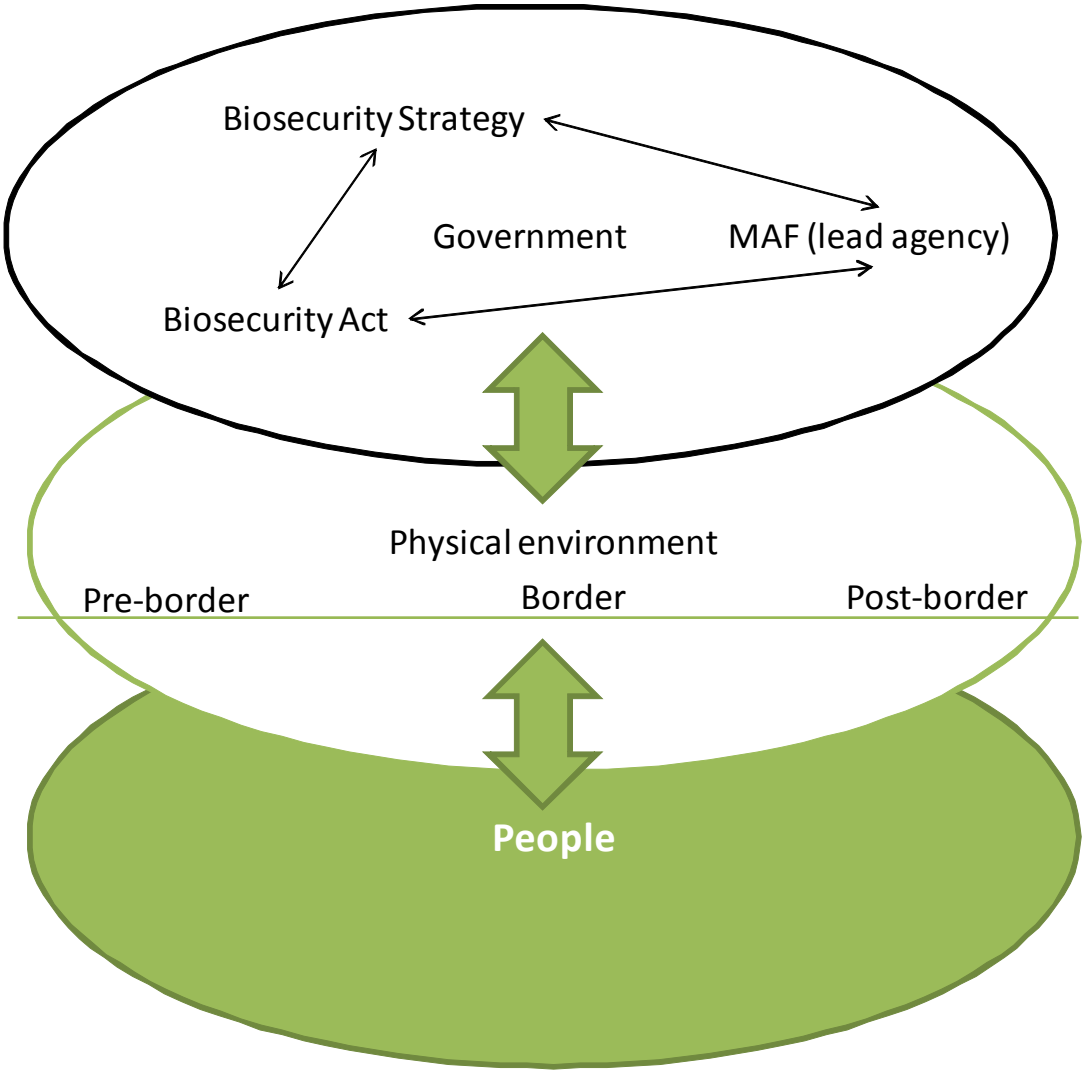

Figure 1.1: A characterisation of the New Zealand biosecurity system, highlighting the presence of people in all parts of the system

The 'New Zealand Passenger Arrival Card – and Notes' (Ministry of Agriculture and Forestry, n.d.-a) is typically distributed at the beginning of a flight to New Zealand. All passengers who are stopping in New Zealand are required to complete the card. MAFBNZ staff use the information provided to assess the biosecurity risk posed by each individual. The arrival card – a tear off card at the bottom of the notes – collects details such as name, address, passport and birth date and place. Individuals are asked to indicate whether

they are bringing into New Zealand any food, animals or animal products, plants or plant products, or other risk items. They are also asked whether they have been in contact with any animals (with the exception of domestic dogs and cats); if they have been to a farm, abattoir or meat packing house; and if they have been in a forest, and/or hiked, camped or hunted in rural areas or parkland. The 'Biosecurity Notes' section provides more details on the type of risk goods that need to be declared.

A video presentation played on board most aircraft coming into New Zealand is another source of information for individuals. This video details the requirement to declare all risk goods, or dispose of them in amnesty bins. A third source of information for individuals is a pamphlet detailing the requirements to declare risk goods. MAFBNZ provide this pamphlet to travel agents for distribution (Ministry of Agriculture and Forestry, n.d.-b). However not everyone would receive a copy of the pamphlet, as not everyone would have had contact with a travel agent, and there is no current information on how widely it is distributed.

Information on biosecurity is also provided through signage and public announcements in the international arrivals area, from MAFBNZ staff and via the MAFBNZ website (www.biosecurity.govt.nz). In addition, there are amnesty bins provided for individuals to dispose of unwanted risk items within the international arrivals hall at each airport. Announcements are also sometimes made on board aircraft reminding people to declare risk goods. Instant fines were introduced in 2001 for any individual who failed to declare risk goods (Hobbs, 2000). In 2002 this was reinforced with the introduction of mandatory x-raying or searching of all luggage (Whyte, 2005). These provided a means of checking to ensure that risk goods were declared, and if not declared, were more likely to be found through the x-raying process.

MAFBNZ also has a detector dog programme to detect items that may be a biosecurity risk (MAF Biosecurity New Zealand, n.d.-b). Detector dogs have been used widely around the world for a range of detection work, including detecting biosecurity risk goods (Wiese, 2008). In New Zealand the detector dog programme began in 1995, with dogs working in Auckland airport from 1996 (MAF Biosecurity New Zealand, n.d.-a).

Despite the effort put into providing information to individuals on biosecurity, engagement and response to the biosecurity system and its requirements varies. To illustrate figures obtained from MAF Biosecurity New Zealand (2008) show that in 2007/08, 4.8 million air passengers arrived into New Zealand. Air passengers are the main focus here because they are substantially higher in number. For comparison, in 2007/08 there were 54,900 people who arrived via a cruise vessel.

Two million of the 4.8 million air passengers were returning New Zealand residents. In the same time period there were 128,800 seizures of biosecurity risk goods from 114,000 passengers. Of these seizures, 17,600 of them were not declared (from 16,900 passengers). Most of the passengers with undeclared risk goods were returning New Zealand residents (2,873, 17 %), followed by passengers from Europe (2,366, 14 %), China (2,197, 13 %) and the United Kingdom (1,859, 11 %).

The risk represented by these undeclared goods is high. The most common undeclared risk good seized was fruit fly host material (53 %). Fruit flies represent a major biosecurity threat to the New Zealand horticultural industry, which is currently free of this pest (Suckling, Jang,

Holder, Carvalho, & Stephens, 2008). Past incursions of fruit fly have been linked to smuggled fruit from air passengers (Stephenson, Gill, Randall, & Wilson, 2003).

This suggests there is a gap between what is considered important to individuals and priorities set by the New Zealand government as defined by the New Zealand biosecurity system, especially in terms of complying with regulations and reporting biosecurity risks. Given the importance of people in the system, understanding individuals' response to New Zealand biosecurity requirements is fundamental to ensuring that the New Zealand biosecurity system succeeds in managing biosecurity risks posed by people. A brief review of the literature on social research in biosecurity follows.

1.4 Social research in biosecurity

Most of the introductions of invasive species around the world have been caused by humans (García-Llorente *et al.,* 2008; Vitousek *et al.,* 1997). However, social research encompassing the human element of biosecurity is rare in the literature. One of the few examples of published research undertaken in New Zealand was by Hall (2003; 2005). Hall focused on wine tourism and potential biosecurity issues. Humans have the ability to spread several grape diseases, posing a considerable threat to vineyards. In the USA, Australia and New Zealand, in order to alert officials to potential biosecurity risks, passengers are asked at the border to declare whether they have been on a farm (Hall, 2003, 2005). Hall surveyed 324 visitors to wineries and vineyards in Marlborough, Canterbury and Central Otago. Over 60 % of respondents did not believe that a vineyard or winery was a farm and therefore would not have declared that they had visited a farm (Hall, 2003, 2005). As Hall (2003; 2005) points out, this has considerable implications for biosecurity communication and education campaigns.

More recently García-Llorente *et al.* (2008) assessed the perceptions of different stakeholders affected by invasive species in Spain in order to evaluate the extent of public support for mitigation or eradication strategies. They found that species that were not native were only recognised as such if the introduction of that species was recent. They concluded that raising awareness of the impact of invasive species was essential, particularly if an eradication programme was being planned (García-Llorente *et al.,* 2008).

Some research, assessing the response of individuals arriving by air to New Zealand's biosecurity requirements, was undertaken for MAF by Massey University in 1999 and 2000 (Rauniyar, Whyte, Winton, & Cheyne, 2000; Rauniyar, Winton, Whyte, & Cheyne, 1999). This research, carried out before the introduction of instant fines and mandatory baggage screening, was designed to identify factors influencing travellers' behaviour, assess the impact of the current strategies designed to influence travellers' behaviour and identify any additional strategies that could influence travellers' behaviour. Rauniyar *et al.* (1999) found that there were considerable gaps in travellers' knowledge and awareness of New Zealand's quarantine requirements and that travel agents did not routinely provide this information when tickets were booked. They suggested that instant fines, along with other measures designed to inform passengers, would help minimise biosecurity risks.

Further research amongst travellers to New Zealand, undertaken in 2004 by UMR Research Limited, indicated that travellers were more aware of New Zealand's quarantine restrictions compared to travellers in 1999/2000. Eighty-four percent of respondents said they had heard, read or seen information on biosecurity and 66 % said that they recalled seeing information on quarantine rules when arriving at the airport (UMR Research Limited, 2004b). This

suggests that the introduction of instant fines and mandatory baggage screening modified individuals' perceptions of biosecurity by providing a reason for looking for information on biosecurity requirements.

UMR Research Limited also surveyed the general public in New Zealand (UMR Research Limited, 2004a). They used focus groups and a phone survey to explore how important biosecurity was and declared levels of knowledge. In focus groups, the level of personal responsibility shown by individuals varied, however the quantitative survey results indicated that most (92 %) of respondents strongly agreed or agreed that 'everyone in New Zealand, including me personally, has a responsibility for New Zealand's biosecurity' (UMR Research Limited, 2004a). Younger respondents, i.e. those under 30 years of age, were less likely to have as much knowledge of biosecurity as older respondents and indicated they were less likely to declare risk goods.

1.5 Research focus

The need for compliance with biosecurity requirements at borders is critical for managing biosecurity risks and, as outlined above, this compliance is not perfect. The research outlined in this thesis was designed to provide some insights into why this occurs through developing an understanding of individual engagement with the issue of biosecurity and individual response to information received on biosecurity. The broad research questions addressed were:

1. Do individuals care about biosecurity?
2. Can biosecurity information be framed in a way that will create engagement with the issue and hence increase willingness to declare risk goods?

Traditionally, most approaches to understanding individual behaviour towards regulations, such as biosecurity requirements at the border, have been based on deterrence theory where self interest is the motivator for behaviour (Akers, 1990; Winter & May, 2001). However, social and normative motivations have recently been included in seeking to understand individual responses to compliance issues (Winter & May, 2001). The fundamental tenet of these approaches is that an individual's actions are governed by their attitudes. There are a range of behavioural models based on the formation of attitudes such as the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Elaboration Likelihood Model (Petty, Cacioppo, & Schumann, 1983) and the Precaution Adoption Process Model (Weinstein & Sandman, 1992). However these models assume that the decision made by the individual on the subject is important enough to merit the effort of forming an attitude (Priluck & Till, 2004).

Given this, it is important to understand when individuals are more likely to invest time and effort into decision-making regarding their behaviour towards regulations, in this instance, their response to New Zealand's biosecurity requirements. Investing time and effort into decision making tends to be reserved for more important decisions while automatic processes that require less effort are employed to make routine, unimportant decisions (Derbaix & Vanden Abeele, 1985). An individual's perception of the importance of a decision relates to their 'involvement' with the issue or object. Hence, understanding individual behaviour regarding biosecurity and identifying ways in which that behaviour could be shaped requires an understanding of the influence of involvement. Involvement has been described as a means of determining how important an issue or object is to a person (Laaksonen, 1994; Zaichkowsky, 1986) and thus has implications for the extent of information processing and

hence behaviour (Salmon, 1986). In the next chapter the literature on involvement is described and the specific research questions for this study are outlined.

Chapter 2: Review of the literature on involvement

"*When we are involved, we pay attention, perceive importance and behave in a different manner than when we are not involved*" (Zaichkowsky, 1986, p. 12).

2.1 Understanding behaviour and response to regulations

Human behaviour has a large influence on the establishment and spread of invasive exotic species (Perrings *et al.,* 2002). The requirements of the New Zealand biosecurity system are designed to modify human behaviour and reduce the risk of biosecurity incursions through the imposition of regulations (Jay *et al.,* 2003). Individuals – returning New Zealanders and other travellers – arriving at the border are required to declare all risk goods before entering New Zealand. Compliance with this regulation determines how successfully the risk of biosecurity incursions is managed (Forer & McNeill, 2008). The response of individuals to biosecurity requirements is the focus of the research outlined in this thesis.

Traditional economic approaches to compliance behaviour tend to be based on the rational choice model of deterrence theory (Frank, 1987; Winter & May, 2001). The rational choice model assumes individuals will pursue self interest and that this is the primary motivator for their behaviour (Akers, 1990). Under these circumstances, an individual's perception of the likelihood of detection and the penalty involved determines how effective enforcement strategies are (Murdoch, Bewsell, Lourey, & Kaine, 2006; Winter & May, 2001). However, there are numerous examples where this does not occur, i.e. individuals choose to follow the rules, even if it is not in their self interest to do so (Frank, 1987; Sutinen & Kuperan, 1999). Given this, some authors have advocated for combining economic, sociological and

psychological approaches from the literature to help understand human behaviour in these circumstances (Sutinen & Kuperan, 1999; Winter & May, 2001).

There are a range of human behaviour models available from sociology and psychology (Fishbein & Ajzen, 1975; Petty *et al.,* 1983; Weinstein & Sandman, 1992). Most recognise the fundamental role that attitudes appear to have on human behaviour (Murdoch *et al.,* 2009) although few also acknowledge the natural (biological) context in which we live. The current biological and geographical environment has a direct impact on biosecurity, determining what is considered an unwanted or invasive exotic species, and humans have an impact on the natural world through the accidental and deliberate introduction of exotic species. However, the main limitation of these models is the assumption that a decision is sufficiently important to an individual for them to go to the effort of forming an attitude (Murdoch *et al.,* 2009; Priluck & Till, 2004). Attitudes that align strongly to behaviour tend to be strongly held and easily accessible (Fazio & Olsen, 2003; Glasman & Albarracín, 2006; Kokkinaki & Lunt, 1999).

Involvement, defined as a measure of the intensity of an individual's motivation in regard to a decision (Verbeke & Vackier, 2004), helps put some of the models of human behaviour mentioned above into context. If a person is highly involved they will put time and effort into forming an attitude. If they are not involved, while they may be able to express an attitude, it may not be particularly reflective of their behaviour (Murdoch *et al.,* 2009). Understanding an individual's involvement in an issue should provide some information on how strongly their attitudes are held and whether their attitudes will be a good predictor of their behaviour.

2.2 Describing involvement

As part of the development of their theories in social psychology Sherif, Sherif, and Nebergall (1965) described the concept of involvement. The concept of involvement was defined as the arousal of self identity in a particular context, termed ego-involvement (Salmon, 1986). Sherif *et al.* (1965) determined that individuals who were uninvolved would respond to information differently to those who were highly involved. Individuals who were highly involved were deemed to be more resistant to persuasion and attempts to change their attitudes (Salmon, 1986).

Around the same time, researchers in the advertising field were realising that the way in which individuals responded to advertisements differed. Krugman (1965) was the first in that field to describe and explore involvement. Krugman felt that involvement was a cognitive process, defining involvement as "…*the number of 'bridging experiences,' connections, or personal references per minute that the viewer makes between his own life and the stimulus*" (Krugman, 1965, p. 355).

Zaichkowsky (1986) defined involvement as a function of the person, the object and the situation, as outlined in Figure 2.1. In this conceptualisation of involvement, Zaichkowsky (1986) acknowledged the role and influence of both the issue and information on involvement.

Mitchell (1979) separated the definition of involvement into two types, and described involvement as either a state variable or a process. Viewing involvement as a state aligned with the Sherif school, whereas process definitions of involvement were more aligned with Krugman's work (Mitchell, 1979). In an early review of involvement, Antil (1984) felt that

most researchers viewed involvement as how personally important an object or issue was to an individual, thus aligning themselves with Mitchell's view of involvement as a state and reflected personal connections with an object (Laaksonen, 1994). At present most researchers concur with this point of view (see for example Andrews, Durvasula, & Akhter, 1990; Celsi & Olson, 1988; O'Cass, 2000).

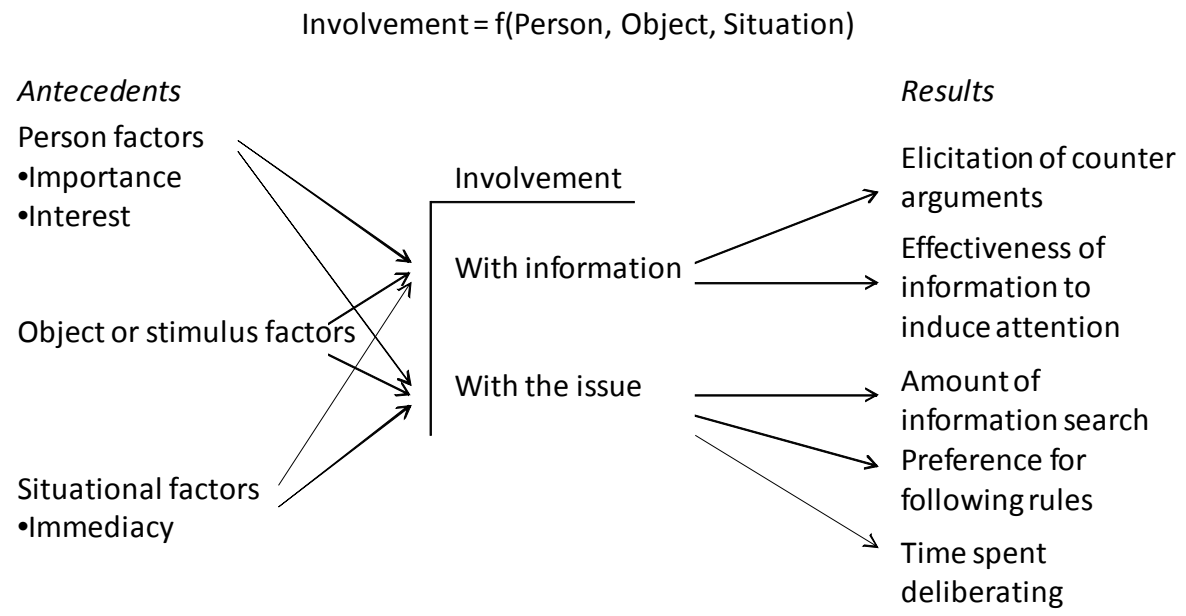

Figure 2.1: A conceptualisation of involvement, adapted from Zaichowsky (1986)

Involvement, viewed as a function of the person, object and situation, must have a direction (Laaksonen, 1994; O'Cass, 2000) and strength or intensity, determined by the mobilisation of resources in order to achieve a goal (Poiesz & deBont, 1995). Where involvement is low, attention and cognitive effort will be low. According to Sherif *et al.* (1965) uninvolved individuals tended to base their response on the order of arguments, the style of communication, and even the identity of the communicator. Alternatively, where involvement is high, attention and cognitive effort is likely to be high (Celsi & Olson, 1988). Viewed in this manner, involvement could be seen as a dichotomous variable, i.e. either high

or low, particularly in the context of advertising (Krugman, 1965) but also in terms of consumer purchasing (Assael, Pope, Brennan, & Voges, 2007). Typical high involvement consumer purchases are houses, vehicles and clothing (Assael *et al.*, 2007). Low involvement consumer purchases are routine and inexpensive items (Assael *et al*., 2007). Assael *et al.* (2007) has used this simplified typology to characterise consumer decision-making into four types of decision-making (Table 2.1). Researchers have disputed this view, with Rothschild (1984) presenting a counterargument, describing involvement as a continuous variable. He concluded this view meant involvement was a difficult concept to research and felt that dealing with involvement as a dichotomy was to be preferred (Rothschild, 1984).

Table 2.1: An outline of four types of decision making

	High involvement	**Low involvement**
Decision making (High effort)	Complex decision making	Limited decision making
Habit (Low effort)	Brand loyalty	Inertia

Adapted from Assael *et al.* (2007)

2.3 Involvement and response to information

Kapferer and Laurent described five dimensions or sources of involvement – interest, pleasure, sign, risk importance and risk probability (Kapferer & Laurent, 1985; Laurent & Kapferer, 1985). More recently researchers have modified these describing a range of types of involvement, including the definition of enduring and situational involvement (Chandrashekaran & Grewal, 2003; Gardner, Mitchell, & Russo, 1985; Havitz & Mannell, 2005; Muncy & Hunt, 1984; O'Cass, 2000; Richins & Bloch, 1986). Researchers have also identified value-, outcome- and impression-relevant involvement (Cho & Boster, 2005; Johnson & Eagly, 1989; Maio & Olson, 1995). Value–relevant involvement is linked to ego involvement and is created when attitudes linked to values are activated. Outcome-relevant

involvement is the linking of personal goals or outcomes to an issue. Impression-relevant involvement is linked to concern over public perception of self. There has been some disagreement about the significance and difference between these types of involvement in the literature, notably by Petty and Cacioppo (1990). In addition, some researchers have also argued that the multiple dimensions outlined by Laurent and Kapferer (1985) reflect the antecedents of involvement rather than involvement per se (Ratchford, 1987).

Recent research on involvement has explored involvement in fashion (O'Cass, 2000), food (Pieniak, Verbeke, Scholderer, Brunsø, & Olsen, 2008; Verbeke, 2008), leisure activities (Havitz & Dimache, 1997; Havitz & Dimanche, 1999; Kyle, Absher, Norman, Hammitt, & Jodice, 2007), health (Gregory, 2004, 2006; Kim, 2006) and services (Bienstock & Stafford, 2006). A plethora of involvement literature is focussed on leisure and tourism. In their review of involvement research Havitz and Dimanche (1997) concluded that leisure involvement was multi-faceted, comprising interest/importance, pleasure/hedonism and symbolic value. Beyond these three factors however, there was little agreement amongst researchers on what other factors may also be important. Two years later, when critiquing 52 leisure involvement data sets, Havitz and Dimanche (1999) concluded that leisure involvement was a complex topic and remained convinced that involvement did influence human behaviour even if the specific mechanisms were still being debated.

Research into involvement in food is also extensive. Although traditionally assumed to be low researchers have found food is not easily categorised into low or high involvement as although it is a routine purchase there can be some risk involved (Verbeke & Vackier, 2004). Researchers have found that, on the whole, consumers are highly involved in their health and that this has implications for how they eat (Verbeke & Vackier, 2004; Pieniak *et al.,* 2008).

Verbeke and Vackier (2004) used involvement as a variable for segmenting food consumers, thus providing more detailed information on their decision making. Involvement has also been proposed as a criterion for recruiting participants for sensory panels, to target those consumers who have high involvement in food as a means of ensuring that product differences can be detected when they exist (Bell & Marshall, 2003).

2.4 Involvement and communication

Involvement has been shown to regulate the way in which people receive and process information (Heath & Douglas, 1991; Salmon, 1986). Audience involvement is therefore perceived to be important for designers of information and communication campaigns as involvement will provide some indication of how audiences may approach the information provided (Gregory, 2004; Kim, 2003). In effect: "*Involvement determines whether the audience is active or passive…*" (Roser, 1990, p. 571).

Greenwald and Leavitt (1984) proposed four levels of audience involvement. Each level is associated with differing levels of attention and information processing. Communication campaigns tend to be most effective amongst people who are involved in the issue already (Gregory, 2004; Larson & Massetti-Miller, 1984). Audiences with low involvement are the most challenging (Gregory, 2004).

Generally those people who are highly involved with an issue will be prepared to devote time and effort evaluating information associated with that issue and will already have appropriate frames of reference (Heath & Douglas, 1991; Petty *et al.,* 1983; Rimal & Real, 2005). However, those who have low involvement may notice other cues, such as the way in which the information is presented (Rimal & Real, 2005) and the message source (Petty et al.,

1983). To illustrate, Larson and Massetti-Miller (1984), when evaluating a communication campaign designed to increase recycling, found that although there was no change in recycling behaviour, there were attitude changes, but only amongst those people who already recycled, i.e. those who had high involvement. Similarly, Sansgiry, Cady, and Sansgiry (2001) found that when consumers were highly involved in purchasing over-the-counter medication they were more likely to understand the label and evaluate it accordingly; however their high involvement did not necessarily increase the likelihood of purchasing the medication.

2.5 Message framing

Research in message framing has demonstrated a mix of results, with some researchers emphasising the need to highlight the negative, and others equally adamant that positive framing is more effective (Levin, Schneider, & Gaeth, 1998). Obermiller (1995) found that effectiveness of positive or negative appeals depended on the issue with neither inherently superior. Shiv, Edell Britton, and Payne (2004) found that when motivation to process information is low and the opportunity to process information is low, negatively framed messages are more effective. However negatively framed information was less effective when the opportunity to process information was high. In their review of research on message framing Levin *et al.* (1998) identified three types of framing – risky choice framing, attribute framing and goal framing – in order to be able to interpret the differences in framing effects across a range of studies. In regard to involvement, Levin *et al.* (1998) speculated that individuals who were highly involved were less susceptible to framing effects, however it was still not entirely clear how and whether involvement had an influence (Illies & Reiter-Palmon, 2004). Maheswaran and Meyers-Levy (1990) found that negatively framed messages were more persuasive for individuals who were highly involved. Donovan and Jalleh (1999)

had a similar result for high involvement individuals, but not for those with low involvement. They concluded further research was needed to explore the impact of involvement on message framing. The research presented by Shiv *et al.* (2004) supported the general conclusion that negatively framed messages are more effective when involvement is high, providing that motivation to process information is aligned with high involvement.

Kim (2003) proposed a health campaign model based on individuals' level of situational and enduring involvement, which provided details of the strategies for framing messages depending on the type and level of involvement. Four optimal strategies were defined, one for each involvement situation. These were; an affect-evoking strategy for low enduring and situational involvement, a cue evoking strategy for low enduring involvement and high situational involvement, an information oriented strategy for high enduring and low situational involvement, and a balanced argument strategy for high enduring and situational involvement (Kim, 2003). Kim's (2003) results supported the effectiveness of each of these strategies, although she acknowledged that none could be used independently.

In the psychology literature a recent paper focused on the use of social norms as a basis for framing information (Cialdini *et al.,* 2006). Cialdini *et al.* (2006) explored the impact of negatively worded communications while attempting to reduce the theft of petrified wood in a National Park in Arizona, USA. They found that rather than focussing on the frequency of undesirable behaviour, and thus establishing an acceptable social norm, focussing on disapproval of undesirable behaviour was more effective in reducing this behaviour. Interestingly the research was disregarded by the park administrators and the original, less effective, signs were kept.

2.6 The research problem – response to New Zealand biosecurity requirements

In terms of biosecurity there is no research that has directly measured people's involvement with this issue and the effect this has on response to information provided on biosecurity. This suggests there is a need to determine firstly how involved people are with biosecurity. Although the research undertaken by UMR Research Limited (2004a) found that most respondents felt they were personally responsible for New Zealand's biosecurity, there are obvious discrepancies between declared importance for the issue and actual behaviour as demonstrated by the number of New Zealanders failing to declare risk goods at the border (MAF Biosecurity New Zealand, 2008).

Secondly, there is a need to determine whether the level of involvement with biosecurity influences the way in which people process the information with which they are provided. Putting some of the research findings outlined above regarding involvement and communication strategies into the context of biosecurity could provide some indication of the most successful ways in which to communicate information on biosecurity issues.

2.7 Research questions

The questions to be addressed through this research are:

1. What is the level of involvement with New Zealand biosecurity requirements? (*Do people care about biosecurity?*)
2. Does varying the way in which the information is framed (informative versus emotional versus social norms) influence the effectiveness of the information provided? (*Is the information framed in a way that will create involvement and willingness to declare risk goods?*)

In the next chapter, the methodology used to answer these questions is outlined.

Chapter 3: Methods

"*Because scale length has constrained PII's wider use, elimination of items with anything less than complete certainty about their content validity serves to make the residual PII more valuable, not less*" (Mittal, 1995, p. 677).

3.1 Introduction

There were two parts to this research; the first was apply an involvement scale to the issue of biosecurity, and the second was to test the effect of framing information on biosecurity and to determine whether this made a difference to the response of participants. The methods used were quantitative, with scales drawn from the literature on involvement and communication, to measure involvement and response to information.

3.2 Measuring involvement

The first research question was to determine whether individuals were involved in biosecurity by measuring involvement using one of the scales developed in the marketing literature. There have been a range of scales developed to measure involvement. O'Cass (2000) found that 23 measures had been developed to measure involvement in the last 40 years. These ranged from simple elicitation of overall level of involvement (Zaichkowsky, 1985) to measuring involvement across several dimensions, thus identifying source of involvement (Kapferer & Laurent, 1985). A review of the literature revealed a number of potential scales applicable to the research outlined in this thesis. These were; Zaichkowsky's (1985) involvement scale, the Personal Involvement Inventory (PII), Kapferer and Laurent's (1985) Consumer Involvement Profile (CIP), the Modified Involvement Scale (MIS) developed by

Kyle, Absher, Norman, Hammitt, and Jodice (2007) and Bell and Marshall's (2003) involvement scale.

Zaichkowsky's (1985) involvement scale, the PII, was designed to measure involvement defined as "*a person's perceived relevance of the object based on inherent needs, values and interests*" (Zaichkowsky, 1985, p. 342). The PII covered personal, physical and situational involvement to provide an overall measure of involvement. It was a simple scale with 20 word pairs or items used to represent different aspects of involvement such as important/unimportant and of no concern/of concern to me. Each item was added up to give a total score of involvement between 20 and 140. McQuarrie and Munson (1987) revised Zaichkowsky's PII, renaming it RPII. They reduced the scale to 14 items, and incorporated some of Kapferer and Laurent's (1985) items into the scale in an attempt to account for different dimensions of involvement. Later, McQuarrie and Munson (1992) revised it again, reducing it to 10 items. Mittal (1995) further refined the PII, reducing it to five items. Mittal excluded word pairs that were designed to identify sources of involvement, i.e. antecedents of involvement, those items that had been identified as having presented confounding issues and the attitude items from the original scale. Mittal (1995) argued that this reduced the scale to items that operationalised involvement, rather than identifying sources of involvement. Zaichkowsky (1994) also revised the PII, reducing the scale to 10 items, and attempted to identify two sub-scales within the PII, an affective and a cognitive grouping.

Kapferer and Laurent's CIP measured involvement across five dimensions (Kapferer & Laurent, 1985, 1993; Laurent & Kapferer, 1985). The CIP had 15 statements for respondents to rate. The CIP has been used in a variety of settings and formed the basis of initial involvement scales in the leisure and tourism research area (Dimanche, Havitz, & Howard,

1991). This scale has also been adapted and used for services rather than products (Gabbott & Hogg, 1999). Mittal and Lee (1988; 1989) used Kapferer and Laurent's (1985) scale as the basis for developing a scale to differentiate between product and brand involvement. Havitz, Dimache, and Howard (1993) compared the PII with the CIP in the context of leisure involvement and found that both scales performed well providing multi-dimensional measures of involvement. They concluded that the type of study would dictate the most appropriate scale.

Two other scales of interest were the MIS and Bell and Marshall's (2003) involvement scale. The MIS was developed to measure enduring involvement in leisure activities (Kyle *et al.,* 2007). The MIS had 15 items measured on a five point scale. Responses were summed to give an overall score of involvement. Bell and Marshall's (2003) involvement scale had 12 items. It was originally designed to measure enduring involvement with food.

The aim of the research described in this thesis was to measure the level of individual's involvement in biosecurity. In most research investigating involvement and communication strategies, the level of involvement is manipulated by demonstrating how the message affects subjects personally (Heath & Douglas, 1990). However, for the research outlined in this thesis involvement was not manipulated. A number of the involvement scales were discarded based on the need to measure overall involvement including Laurent and Kapferer's (1985) scale, and the MIS. Laurent and Kapferer's (1985) scale was designed to measure and identify source of involvement rather than overall level of involvement, as was the MIS. Bell and Marshall's (2003) scale was also discarded because of the large number of items.

Mittal's (1995) revision of the PII was chosen because it was designed to measure overall involvement. This scale is short, containing only five items. This helped address several issues, highlighted by McQuarrie and Munson (1987), including reducing respondent fatigue and reducing the length of a survey with an involvement scale. Items marked with an asterisk were reverse scored, as this is how they appeared in Zaichowsky's original scale. The five item scale is outlined in Table 3.1.

Table 3.1: Mittal's (1995) five item scale for measuring involvement

Important to me	1	2	3	4	5	Unimportant to me*
Of no concern to me	1	2	3	4	5	Of concern to me
Means a lot to me	1	2	3	4	5	Means nothing to me*
Matters to me	1	2	3	4	5	Does not matter to me*
Significant	1	2	3	4	5	Insignificant*

* To be reverse scored

In order to cover the range of issues covered by the term biosecurity, five keywords associated with biosecurity were identified through a search of relevant internet sites. Each was then defined and checked with scientific experts. The five keywords were; biosecurity, quarantine, invasive animal species, invasive insects, and exotic diseases of plants, animals and humans. Mittal's (1995) scale was used to measure participants' involvement in each of these areas. The definitions for each are outlined in Table 3.2.

In addition, participants were asked to indicate their overall view of biosecurity by responding to several statements about biosecurity. The statements were adapted from Obermiller (1995) who used them to determine perceived control, concern and importance of water and energy conservation and recycling and solid waste reduction. The statements, outlined in Table 3.3, were rated on a 5 point scale, where 1=strongly disagree, 5=strongly agree. The responses to these scales provided a means of validating the calculated level of involvement from Mittal's scale.

Table 3.2: Definitions for five keywords associated with biosecurity

Keyword	Definition
Biosecurity	Keeping out, getting rid of or managing risks posed by pests or diseases to the economy, environment and human health
Quarantine	The process of trying to minimise risk of exotic pests and diseases entering a region
Invasive animal species	Animals native to another region that spread widely and cause harm in another region
Invasive insects	Insects native to another region that spread widely and cause harm in another region
Exotic diseases of plants, animals and humans	Any disease or strain of a disease that is new to New Zealand. Often these diseases have the potential to spread quickly and cause severe problems and/or death to the plant, animal or person that catches it

Table 3.3: Statements and scale used to indicate participants overall view of biosecurity

	Strongly disagree				Strongly agree
There is not much one individual can do about biosecurity	1	2	3	4	5
The effort of one person to declare risk goods is useless as long as other people refuse to declare risk goods	1	2	3	4	5
The biosecurity risk to New Zealand is exaggerated, in the long run things balance out	1	2	3	4	5
I don't think New Zealand biosecurity is very important	1	2	3	4	5
The potential seriousness of biosecurity is frightening	1	2	3	4	5

3.3 Reframing information

The second research question was to determine whether differently framed messages had an impact on the response of participants. A series of postcards was developed for this purpose. Postcards are often used to communicate messages in social issues campaigns (Gregory, 2006). Four postcards were designed (see Figures 1 – 4). Each had a different message strategy based on Gregory's (2006) grouping of attention-getting strategies and the social norms approach as outlined by Cialdini *et al.* (2006).

The first card, Figure 3.1, invited respondents to 'join their fellow travellers in helping to protect New Zealand's environment', and stated that over 90% of people already declare risk goods. This postcard was designed with a social norms message strategy. This strategy relies on evoking either a descriptive or injunctive norm. A descriptive norm refers to an action that is commonly performed, whereas injunctive norms refer to actions that are social rewarded or punished (Cialdini *et al.*, 2006; Goldstein, Griskevicius, & Cialdini, 2007). In this case, the aim was to highlight that most people declare risk goods when coming across the border and thus fulfil their biosecurity regulation requirements. This was a descriptive norm.

Figure 3.1: Postcard 1, designed with a social norms message strategy

The second card, Figure 3.2, was focussed on the need to declare all risk items in order to protect New Zealand's environment. This postcard was designed with an information/argument message strategy. This strategy relies on presentation of facts (Gregory, 2006). Information/argument is a common approach to providing information on regulatory requirements.

Figure 3.2: Postcard 2, designed with an information/argument message strategy

The third card, Figure 3.3, attempted to link the view and the environment to the need to declare risk items but had additional information that not declaring risk items could result in a $200 fine, a negative framing. This postcard was designed with an emotion/entertainment message strategy. This strategy relies on an emotive or entertaining device to capture attention (Gregory, 2006), in this case the idealised view of the New Zealand environment, along with the information that there was a fine for not declaring risk items.

The fourth card, Figure 3.4, attempted to link the view, and hence New Zealand's environment, to the need to declare all risk goods. This postcard was designed with an emotion/entertainment message strategy, but this time without the fine highlighted. This was a more positive framing of an emotion/entertainment message strategy.

Figure 3.3: Postcard 3, designed with an emotion/entertainment message strategy, highlighting the $200 fine for not complying with the biosecurity requirements (a negative frame)

Figure 3.4: Postcard 4, designed with an emotion/entertainment message strategy, without highlighting the fine (a positive frame)

Participants were asked to rate each postcard against five criteria, outlined in Table 3.4. The criteria were designed to determine respondents' individual response to each postcard, as well as providing an indication of whether they felt each postcard would influence others to

declare risk goods. Responses were measured on a 5 point scale where 1=strongly agree, and 5=strongly disagree.

Table 3.4: Five criteria for rating each postcard

Criteria	Strongly disagree				Strongly agree
Creates some interest for me	1	2	3	4	5
Would make me pick it up	1	2	3	4	5
Would make me think about biosecurity	1	2	3	4	5
Would influence me to declare risk goods	1	2	3	4	5
Would get most people to declare risk goods	1	2	3	4	5

3.4 Recall and response to biosecurity information

Respondents were asked a series of questions about their response to a range of biosecurity requirements and information. As level of involvement was thought to influence the amount of information search and effort put into decision making, some indication of the biosecurity information individuals had seen and noticed, and their response to that information, was required.

Respondents were asked to indicate if they had seen information in the form of:

- A brochure/pamphlet on biosecurity
- A video shown on board most inbound international aircraft
- The notes on the New Zealand passenger arrival card
- Amnesty bins
- Other information and signs in the international arrivals hall

Respondents were also asked if they had seen the detector dogs.

Those who indicated they had watched the video were asked whether the video had covered biosecurity issues. Those respondents who indicated they had not read the notes on the

passenger arrival card were asked why they had not read them. Respondents were also asked to rate the effect of the information provided. The criteria used to do this are outlined in Table 3.5.

Table 3.5: Three scales for rating the biosecurity information recalled

Criteria for rating the information recalled	**No change**				**Changed my mind and declared risk items**
Changed your decision about risk items, when coming back into New Zealand	1	2	3	4	5
	Not very useful				**Very useful**
Usefulness of the information to help you understand what a quarantine item was or to prompt you to think about biosecurity issues when coming back into New Zealand	1	2	3	4	5
	Not very important				**Very important**
Importance of the information in making you aware of the biosecurity requirements when coming to New Zealand	1	2	3	4	5

3.5 Demographic information

Respondents were also asked to provide a range of demographic information. This included how often they had travelled internationally by air in the last 12 months, international travel destinations in the last 12 months, country of birth, age, gender and whether they worked in an industry that dealt with biosecurity issues.

3.6 Survey development

Web based surveying has become a common method for obtaining information, particularly as computer hardware and software have improved and the number of people with access to the internet has increased (Birnbaum, 2004). Researchers across a range of disciplines have

been exploring the advantages and disadvantages of web based methodology including economists (Fleming & Bowden, 2009), psychologists (Birnbaum, 2004), and education (Sax, Gilmartin, & Bryant, 2003) and health researchers (Rhodes, Bowie, & Hergenrather, 2003). Web based surveys allow a range of visual materials to be presented (Birnbaum, 2004; Fleming & Bowden, 2009).

There are a number of advantages to web based surveying, including ease of use, a wide pool of responders, speed of data collection, as well as reducing costs (Rhodes *et al.,* 2003). However there are a number of disadvantages including participant sampling and bias (Fleming & Bowden, 2009; Gosling, Vazire, Srivastava, & John, 2004; Rhodes *et al.,* 2003). Researchers have investigated some of these disadvantages. In their study of six preconceptions about research using internet based methodology, Gosling *et al.* (2004) concluded that it was a valid approach that compared favourably with traditional methods.

For this research a web based survey was considered an effective means of obtaining the information required, particularly given the need to present participants with four colour postcards that could be easily read and evaluated separately. In addition a web based survey was a low cost option. SurveyPro 4 developed by Apian Software was used to design the survey. The initial set of questions was put together in a word file. This was sent to an IT consultant who used it as a template to set up the survey in SurveyPro. The survey was published and piloted by 6 colleagues. Some small changes were required and were incorporated into the survey.

3.7 Ethics

The Lincoln University ethics process was followed. Permission for the study was granted by the Human Ethics Committee (application number 2007-48). The letter of approval is provided in Appendix 1. Participant anonymity was assured because no contact details were collected and there was no means of individually identifying respondents. Data collected from participants was stored electronically in a secure location with only password access.

3.8 Target audience

The focus of the research outlined in this thesis was to understand individuals' response to New Zealand biosecurity requirements. There were a number of characteristics of respondents that were important when selecting a target audience for the survey. The characteristics are outlined in Table 3.6. The first characteristic was that there should be a range of countries of birth amongst respondents. The statistics presented earlier in section 1.3 indicated that individuals born in New Zealand, Europe, China and the UK contributed to an increased risk of a biosecurity incursion. This suggested that obtaining a sample of individuals born in these, and other countries, would be ideal.

The second important characteristic was that individuals had travelled overseas within the last 12 months. This was to ensure that they had some experience of New Zealand biosecurity requirements and were able to indicate the information they recalled on this topic. This characteristic was used as a question at the start of the survey to filter out respondents who had not travelled recently. A third characteristic of respondents was that they had a basic understanding of biosecurity. The survey was not intended as a test, to determine whether respondents knew about biosecurity. To this end, in addition to a sample of respondents with

some understanding of biosecurity, definitions of biosecurity were provided as needed, as outlined in Table 3.2.

The fourth characteristic of respondents was that there was potential for a range of levels of involvement amongst them. This meant that the sample should contain a range of people, with different demographics, and experience of biosecurity. The fifth characteristic of respondents was that they were easily accessed via email for survey distribution.

Table 3.6: Characteristics of research data sample

Criteria	Description
Country of birth	Country of birth was noted in the statistics on who had not declared risk goods
Travelled overseas within last 12 months	Those who had not travelled overseas within 12 months were screened out
Basic understanding of biosecurity	A basic understanding helped ensure that the scale results were a reflection of reality
Differing levels of involvement in biosecurity	Range of potential levels of involvement in biosecurity to ensure the scale applied was useful for high and low involvement
Easy access to sample	Sample able to be easily accessed and surveyed in a timely manner

The population selected for surveying was students and staff at Lincoln University, as well as researchers at two research institutions and participants at the South Island Field Days at Lincoln University. This decision was based on the characteristics required of respondents, particularly in terms of accessibility, and because the population at the University is generally diverse, comprising young adults, adults, international students and staff born and trained overseas. Other researchers have used University students as convenience samples to investigate involvement, notably Gregory (2004), Mittal (1995), Roser (1990), and Zaichkowsky (1985) and all have found these populations useful. In the literature on social research in biosecurity researchers have focussed on particular groups of people, such as

visitors to sites similar to the field days. Hall (2003) surveyed visitors to vineyards in three locations, and García-Llorente et al. (2008) surveyed residents and visitors within a particular region. For further discussion of other potential sample populations see Appendix 2.

The survey was distributed via email to postgraduate students from Lincoln University in August/September 2008 (Sample 1). Emails were sent via faculty staff inviting postgraduates to complete the survey. No incentive to complete the survey was provided. A reminder email was sent approximately two weeks later. The response rate was low, with only 49 responses, from a population of approximately 600, of which 43 were useable.

A second round of surveying was undertaken between February and April 2009. For this round of surveying the target audience consisted of staff at Lincoln University and two research institutions within New Zealand, as well as participants at the South Island Field Days at Lincoln University (Sample 2). Staff at Lincoln University and staff in sections with the research institutions were emailed, inviting them to complete the survey. No incentive to complete the survey was provided. At the field days, attendees who visited the Lincoln University site were asked to complete the survey. Again the response rate was low, with 85 responses, of which 82 were useable. This provided a total of 125 useable responses. Individual respondents were not able to be identified; however, the date when the survey was completed was recorded so participants from the two rounds of surveying could be separated during analysis.

Researchers have noted widely varying response rates to web based surveys (Sax *et al.,* 2003). One of the challenges of web based surveying is that response rates are usually incalculable because it is impossible to determine the number of individuals who may have

received an email about the survey or accessed the survey site (Andrews, Nonnecke, & Preece, 2003; Rhodes *et al.,* 2003). This was the case for Sample 2. However, some indication of response can be determined from Sample 1 as the number of respondents that received an email about the survey could be estimated (approximately 600 postgraduate students). A total of 49 responses represented a response rate of 8%. However it was impossible to determine whether all postgraduates received information about the survey, and/or received a reminder to complete the survey. Sax *et al.* (2003) offer a number of reasons for low response rates to web based surveys that are particularly relevant in this situation, as their research focussed on response rates from surveying college students in the USA. Some reasons for a low response rate could be that students may not check email accounts regularly; students could have privacy concerns; and the length of the survey.

3.9 Data analysis

Data were analysed using the Minitab software package. Overall involvement in biosecurity was calculated using Mittal's (1995) adaption of the PII. Chi square, Mann-Whitney, and Friedman tests were used to determine significant differences in the data as appropriate.

In the following chapter the results of applying an involvement scale to the issue of biosecurity, and the effect of framing information on biosecurity to determine whether participants responded to these differently, are outlined.

Chapter 4: Results

"*Once a person becomes involved in an issue … he or she is more likely to seek and receive information on the issue and is likely to process that information in different ways than a person who is low-involved*" (Heath & Douglas, 1991, p. 180).

4.1 Introduction

A total of 125 responses were obtained from the web survey. In the first round of surveying (sample 1) 43 usable responses were elicited. In the second round of surveying (sample 2) 82 usable responses were elicited. The data were analysed to determine the demographic composition of the sample. The level of involvement in biosecurity was then calculated and differences in response to information provided on this issue determined.

4.2 Demographics

The sample obtained was heavily weighted towards individuals who worked or were associated with agriculture and land based industries. Nearly two thirds of respondents indicated they worked in one of a range of industries outlined in the survey, selected because of their significance to biosecurity. There were significant differences between the first set of respondents and the second set regarding the range of industries in which they worked (χ^2 = 17.795, P = 0.013). In addition, 37% (n=46) of respondents indicated that they dealt with biosecurity issues at work. In Table 4.1 the range of industries in which respondents worked and whether they dealt with biosecurity issues at work is shown.

Table 4.1: The range of industries in which respondents worked, and the number of respondents who dealt with biosecurity at work (respondents were asked to indicate all that applied so the totals do not sum to 125)

Industry*	**Sample 1**		**Sample 2**		**Total**		
Deal with biosecurity at work	*Yes*	*No*	*Yes*	*No*	*Yes*	*No*	*Not answered*
Agriculture	12	5	24	28	36	33	2
Horticulture	3	3	6	1	9	4	0
Food	3	1	6	2	9	3	0
Importing/Exporting	4	3	0	1	4	4	0
Forestry	1	3	1	1	2	4	0
Freight / Logistics	1	1	1	1	2	2	0
Companion animal	0	0	2	0	2	0	0
Aquaculture	0	1	0	0	0	1	0
Not specified	3	18	3	20	6	38	0

*Significantly different between respondents in Sample 1 and Sample 2; $\chi^2 = 17.795$, P = 0.013

The majority of respondents were under 50 years of age (Table 4.2), evenly spread between male and female (52% male; 46% female) (Table 4.3), and just over half (56%) were born in New Zealand or Australia (Table 4.4). Respondents from Sample 1 were significantly younger than those in the second round, with 51% indicating they were 18 – 30 years old, and another 26% indicating they were 31 – 40 years old. This is not altogether surprising given that the target audience in Sample 1 was postgraduates.

Table 4.2: Age of respondents

Age*	**Sample 1**	**Sample 2**	**Total**
18 - 30	22	16	38
31 - 40	11	18	29
41 - 50	7	17	24
51 - 60	3	19	22
60 +	0	10	10
Age not specified	0	2	2
Total	43	82	125

* Significant difference between Sample 1 and Sample 2; $\chi 2 = 18.470$, P = 0.000

Table 4.3: Gender of respondents

	Sample 1	Sample 2	Total
Female	23	35	58
Male	19	46	65
Gender not specified	1	1	2
Total	43	82	125

Table 4.4: Country of birth

	Sample 1	Sample 2	Total
NZ/Australia	17	53	70
Asia	15	6	21
UK/Europe	6	13	19
USA/Canada	3	6	9
Missing/not specified	2	3	5
South Africa	0	1	1
Total	43	82	125

4.3 Amount of travel and countries visited

Approximately half of all respondents had travelled into New Zealand at least once in the last year (Table 4.5). Only a few respondents, 3%, had come back into New Zealand more than five times in the last year. There were no significant differences between Sample 1 and Sample 2.

Table 4.5: Number of times respondents travelled into New Zealand in the last year

	Sample 1	Sample 2	Total
Once (1)	24	40	64
2-4 times	17	39	56
5-8 times	2	2	4
Not answered	0	1	1
Total	43	82	125

Respondents indicated they had visited a range of countries. Australia and the Pacific were the most popular destinations, followed by Asia, Europe, North America and the UK (Table 4.6). Note that the percentage totals do not add to 100 as respondents could tick more than

one destination. A detailed version of this table is in Appendix 3 (Table 4.6a). There were no significant differences in travel destinations between Sample 1 and Sample 2.

Table 4.6: Countries respondents had visited in the last year

	Sample 1	Sample 2	Total
Australasia/Pacific	24	57	81
Asia	13	22	35
Europe	13	16	29
North America	10	14	24
UK	5	11	16
Latin America	1	3	4
Africa	0	2	2
India	0	2	2
Other	0	2	2
Not answered	2	1	3

4.4 Perceptions of biosecurity

Respondents appeared concerned about biosecurity and felt it was important. As can be seen in Table 4.7, respondents disagreed with the statement that New Zealand biosecurity was not important (mean score of 1.4 where 1=strongly disagree and 5=strongly agree), and disagreed with the statement that there is not much an individual can do about biosecurity (mean score 1.4). Respondents also disagreed that the biosecurity risk was exaggerated (mean score 1.7), and that their individual efforts to declare risk goods were useless (mean score 2.1). Respondents were slightly more likely to agree that the potential seriousness of biosecurity was frightening (mean score 3.8). One significant difference was found when comparing Sample 1 to Sample 2 in terms of their perceptions of biosecurity. Respondents in Sample 2 were more likely to disagree with the statement that the biosecurity risk to New Zealand was exaggerated (mean score of 1.5, compared to a mean score of 2.0 for respondents in Sample 1, P=0.0349). However, overall, the results indicate that biosecurity is an issue of importance to respondents, and could be an indication that they are highly involved.

Table 4.7: Mean scores of respondents perceptions of biosecurity (1=strongly disagree, 5=strongly agree)

	Sample 1	Sample 2	Total
I don't think New Zealand biosecurity is very important	1.3	1.4	1.4
There is not much an individual can do about biosecurity	1.5	1.4	1.4
The biosecurity risk to New Zealand is exaggerated, in the long run things balance out*	2.0	1.5	1.7
The effort of an individual to declare risk goods is useless as long as other people refuse to declare	2.3	2.0	2.1
The potential seriousness of biosecurity is frightening	3.8	3.8	3.8

*Significant difference between Sample 1 and Sample 2 (Mann-Whitney test), P=0.0349

4.5 Overview of data

There were some significant differences between Sample 1 and Sample 2, notably a difference in the age range of respondents, the industries worked in and on one aspect of perceptions of biosecurity. However, on the whole, Sample 1 and Sample 2 were not sufficiently different to continue analysing the data separately. Sample 1 and Sample 2 were therefore combined for rest of the analyses outlined in this chapter.

4.6 Measuring involvement in biosecurity

Overall involvement in biosecurity was calculated using Mittal's (1995) adaption of the PII. Four of the five items on each scale were reverse scored. These were recoded and a total level of involvement calculated by adding the five items together. This provided an involvement score between 5 (the lowest level of involvement) and 25 (the highest level of involvement) for each of the five areas of biosecurity defined in the survey. The average of the five scores was calculated for each individual. Individuals were then grouped into one of four categories, based on their involvement score. The categories were determined in a manner similar to that used by Zaichkowsky (1985), by exploring the distribution of involvement scores, and assessing the ratings needed to obtain those scores. Low involvement was categorised as a

score from 5 to 11. Medium involvement was categorised as a score from 12 to 18. High involvement was categorised as a score from 19 to 24. Very high involvement was categorised as a score of 25, as all five items on the scale were scored 5. As can be seen in Table 4.9, over half of respondents had high involvement, with another 23% indicating they were very highly involved in biosecurity.

Table 4.8: Level of involvement of respondents based on average involvement scores across five areas of biosecurity

Category (involvement score)	**Total number of respondents**	**%**
Low (5 – 11)	2	2
Medium (12 – 18)	26	21
High (19 – 24)	68	54
Very high (25)	29	23
Total	125	100

The involvement data was analysed to determine whether there were any demographic differences between involvement categories. The two individuals who had low involvement were excluded from this and any further analysis because it was not possible to undertake any valid statistical comparison with only two respondents. The only significant difference between respondents with different levels of involvement was their age (χ^2=14.737, P=0.022). Forty-five percent of those respondents with very high levels of involvement were under 30, compared to 25% amongst those highly involved, and 31% amongst those with medium involvement (see Table 4.10). Thirty seven percent of respondents with high levels of involvement were over fifty, compared to 17% of those who were very highly involved and 12% of those with medium involvement. There were no differences in gender, whether biosecurity issues were dealt with at work, or the number of times travelled. This result is similar to that predicted by Diamantopoulos, Schlegelmilch, Sinkovics, and Bohlen (2003) who argued that demographics alone are a poor means of defining an individual in regards to an issue such as biosecurity.

Table 4.9: Age distribution for each level of involvement*

	Level of involvement			
Age	**Medium**	**High**	**Very high**	**Total**
18 - 30	8	17	13	39
31 - 40	11	11	7	29
41 - 50	4	15	4	24
51+	3	25	5	33
Total (n)	26	68	29	125

*Significantly different; χ^2=14.737, P=0.022

The data was also analysed to determine whether there were any differences in the response to the statements about biosecurity based on level of involvement. Generally those individuals with very high involvement had significantly different perceptions from those individuals with medium involvement (see Table 4.11). Individuals who were very highly involved were more likely to agree with the statement that the potential seriousness of biosecurity was frightening (mean score 4, where 1=strongly disagree, and 5=strongly agree) and disagree with statements that biosecurity was not important (mean score 1), not much one person could do (mean score 1.1), that the risk is exaggerated (mean score 1.3) and that the effort of one person to declare risk goods is useless (mean score 1.4). These results confirmed that these individuals were very highly involved with the issue of biosecurity.

Respondents were asked about a range of information provided on biosecurity when travelling into New Zealand (Table 4.12). There were no significant differences between those who had medium involvement, those with high involvement and those with very high involvement in terms of the information they had seen. Most respondents had read the notes on the arrival card (81%), seen the amnesty bins (82%), noticed signs in the arrival hall at the airport (75%) and/or observed the detector dogs (75%).

Table 4.10: Mean score for statements on biosecurity depending on level of involvement (low, medium or high), where 1=strongly disagree, and 5=strongly agree

	Medium involvement	High involvement	Very high involvement
I don't think New Zealand biosecurity is very important*	1.5	1.5	1.0
There is not much one individual can do about biosecurity	1.8[a]	1.4	1.1[a]
The biosecurity risk to New Zealand is exaggerated, in the long run things balance out	2.3[bc]	1.6[b]	1.3[c]
The effort of one person to declare risk goods is useless as long as other people refuse to declare risk goods	2.1[e]	2.3[f]	1.4[ef]
The potential seriousness of biosecurity is frightening	3.6[g]	3.9	4.0[g]

*Mann-Whitney tests were unable to undertaken on this statement as all individuals in the highly involved category had rated this statement 1 (meaning that all values in the column were identical)

[a] Significant difference, P=0.0022

[b] Significant difference, P=0.0026; [c] Significant difference, P=0.0002

[e] Significant difference, P=0.0026; [f] Significant difference, P=0.0007

[g] Significant difference, P=0.0278

Table 4.11: Respondents recall of biosecurity information. Note totals do not sum to 100 because more than one source of information could be selected

	Level of involvement			
	Medium	**High**	**Very high**	**Total**
Number of respondents	26	68	29	125
Saw amnesty bins	20	56	25	103
Read notes on arrival card	21	53	26	101
Saw signs in arrivals hall	17	52	23	94
Saw detector dogs	19	50	24	94
Watched video on plane	9	23	10	43
Saw brochure	4	15	11	31

Only a small number of respondents (n=18, 14%, Table 4.13) had not read the notes. These individuals indicated that they already knew what to declare, did not have anything to declare or indicated they could not be bothered reading the notes.

Table 4.12: Respondents' reasons for not reading the notes on the arrival card (n=18)

	Level of involvement			
Reason for not reading notes on the arrival card	**Medium**	**High**	**Very high**	**Total**
Number of respondents	4	11	2	18
I already knew what I needed to declare	1	7	2	10
I did not have anything to declare	3	2	0	5
Could not be bothered	0	2	0	2

There were some significant differences in the rating of different types of biosecurity information when comparing medium, high and very high involvement respondents. As can be seen in Table 4.14, those who were very highly involved in biosecurity were more likely to indicate that the arrival card was useful than those individuals who had high or medium involvement. Otherwise there were no significant differences in the ratings of usefulness.

Table 4.13: Ratings of usefulness of biosecurity information provided (1=not very useful and 5=very useful)

	Level of involvement		
	Medium	**High**	**Very high**
Usefulness of brochure	3.5	3.9	4.0
Usefulness of video	3.0	3.3	3.4
Usefulness of arrival card	4.0[b]	4.2[a]	4.6[ab]
Usefulness of bins	3.2	3.4	3.8
Usefulness of other info	3.2	3.4	3.4

[a] Significant difference, P=0.0217; [b] Significant difference, P=0.0005

In Table 4.15 the significant differences in ratings of the brochure, video and other information are highlighted in terms of whether the information changed an individual's mind. Those respondents with a medium level of involvement were more likely to be neutral about whether any of the information provided changed their mind about declaring risk goods. Individuals who were less involved were more likely to indicate that the information changed their mind about declaring risk goods.

Table 4.14: Ratings of whether the information provided changed their mind (1=no change and 5= changed my mind and declared risk items)

	Level of involvement		
	Medium	**High**	**Very high**
Brochure changed my mind	2.5	2.1	1.8
Video changed my mind	2.5[ab]	1.7[a]	1.6[b]
Arrival card changed my mind	2.8	2.4	2.4
Bins changed my mind	2.1	1.9	1.8
Other info changed my mind	2.2	1.8	1.7

[a] Significant difference, P=0.0266; [b] Significant difference, P=0.0115

There was no difference between medium, high and very high involvement respondents in their rating of the importance of biosecurity information. Overall, those respondents who were very highly involved rated information as being more useful, but not in terms of changing their mind. Individuals who were less involved were more likely to indicate that the information changed their mind in terms of declaring risk goods, but were less inclined to rate the information as useful.

The results presented to this point indicate that it is possible to measure involvement in biosecurity using Mittal's (1995) revised PII. High involvement in biosecurity was confirmed through the response to statements designed to infer respondents' overall view of biosecurity. Respondents indicated that they felt biosecurity was important and they were concerned about it. This is consistent with high involvement. However, those who were highly involved in biosecurity did not appear to take more notice of information, compared to those who were less involved, although there were some differences between respondents in terms of their rating of biosecurity information. These results are in contrast to the literature on involvement which indicated that those who are more involved would tend to pay more attention to information and put more effort into processing that information. This could be a critical point of difference between being involved in an issue such as biosecurity compared to involvement in terms of consumer behaviour, i.e. purchasing a product.

4.7 Reframing information

Four postcards were used to determine responses to differently framed information on biosecurity (Figure 4.1). The first card invited respondents to 'join their fellow travellers in helping to protect New Zealand's environment', and stated that over 90 % of people already declare risk goods. The second card focussed on the need to declare all risk items in order to protect New Zealand's environment. The third card attempted to link the view and the environment to the need to declare risk items but had additional information that not declaring risk items could result in a $200 fine. The fourth card attempted to link the view (and hence environment) to the need to declare all risk goods.

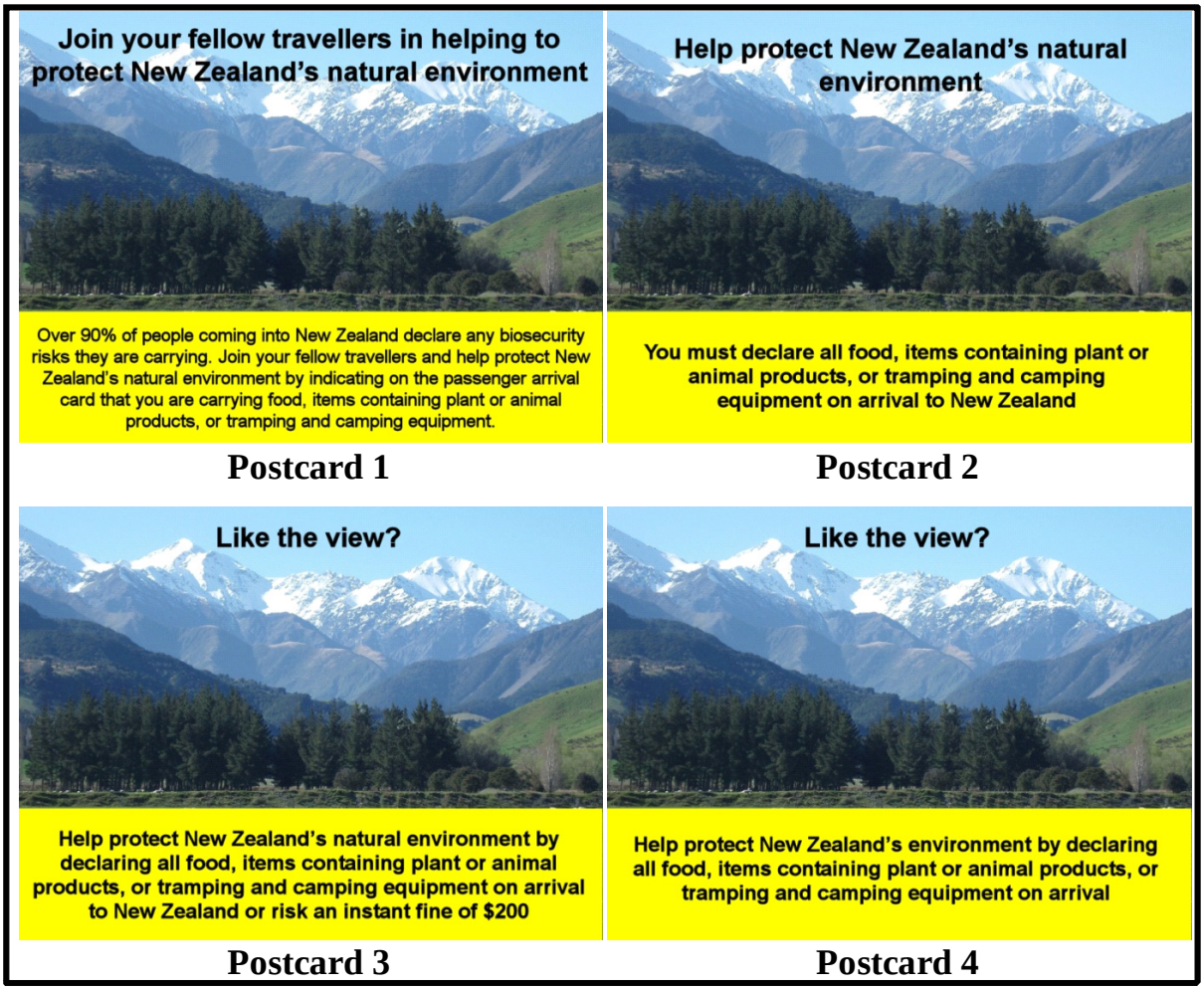

Figure 4.1: Postcards 1 – 4

Respondents were asked to rate each postcard on five criteria. Responses were measured on a 5 point scale where 1=strongly disagree, and 5=strongly agree. The five criteria were; creates some interest for me, would make me pick it up, would make me think about biosecurity, would influence me to declare risk goods, and would get most people to declare risk goods. In Table 4.16 the mean scores from all respondents for each postcard against each criterion are outlined. The postcards were rated neutrally overall. The highest mean score was for Postcard 3, for the criterion 'would influence me to declare risk goods' (mean score 3.8).

Table 4.15: Mean scores for each postcard against the criteria used to rate them (on a five point scale where 1=strongly disagree, and 5=strongly agree)

	Postcard 1	**Postcard 2**	**Postcard 3**	**Postcard 4**
Creates some interest for me	3.5	3.4	3.6[a]	3.4[a]
Would make me pick it up	3.0	3.2	3.3[b]	3.0[b]
Would make me think about biosecurity	3.4	3.5[c]	3.6[c]	3.2
Would influence me to declare risk goods	3.4	3.6	3.8[d]	3.2[d]
Would get most people to declare risk goods	2.9	3.3	3.6[e]	2.8[e]

[a] Significant difference, P=0.010
[b] Significant difference, P=0.000
[c] Significant difference, P=0.000
[d] Significant difference, P=0.000
[e] Significant difference, P=0.000

In order to determine more clearly whether one postcard was rated more favourably than the others, the scores for each postcard against each criterion were graphed and shown in Figure 4.2. The distribution of scores for each postcard reveals that Postcard 3 was generally rated more favourably than the other postcards, with more respondents scoring this postcard a 4 or 5 (where 1=strongly disagree, and 5=strongly agree). Nearly 60 % of respondents rated Postcard 3 a 4 or 5 against the criterion 'creates some interest for me'. Over 40 % of respondents rated Postcard 3 a 4 or 5 against the criterion 'would make me pick it up'. Nearly 60 % of respondents rated Postcard 3 a 4 or 5 against the criterion 'would make me think about biosecurity'. Over 60 % of respondents rated Postcard 3 a 4 or 5 against the criterion

'would influence me to declare risk goods'. Approximately 60 % of respondents rated Postcard 3 a 4 or 5 against the criterion 'would get most people to declare risk goods'.

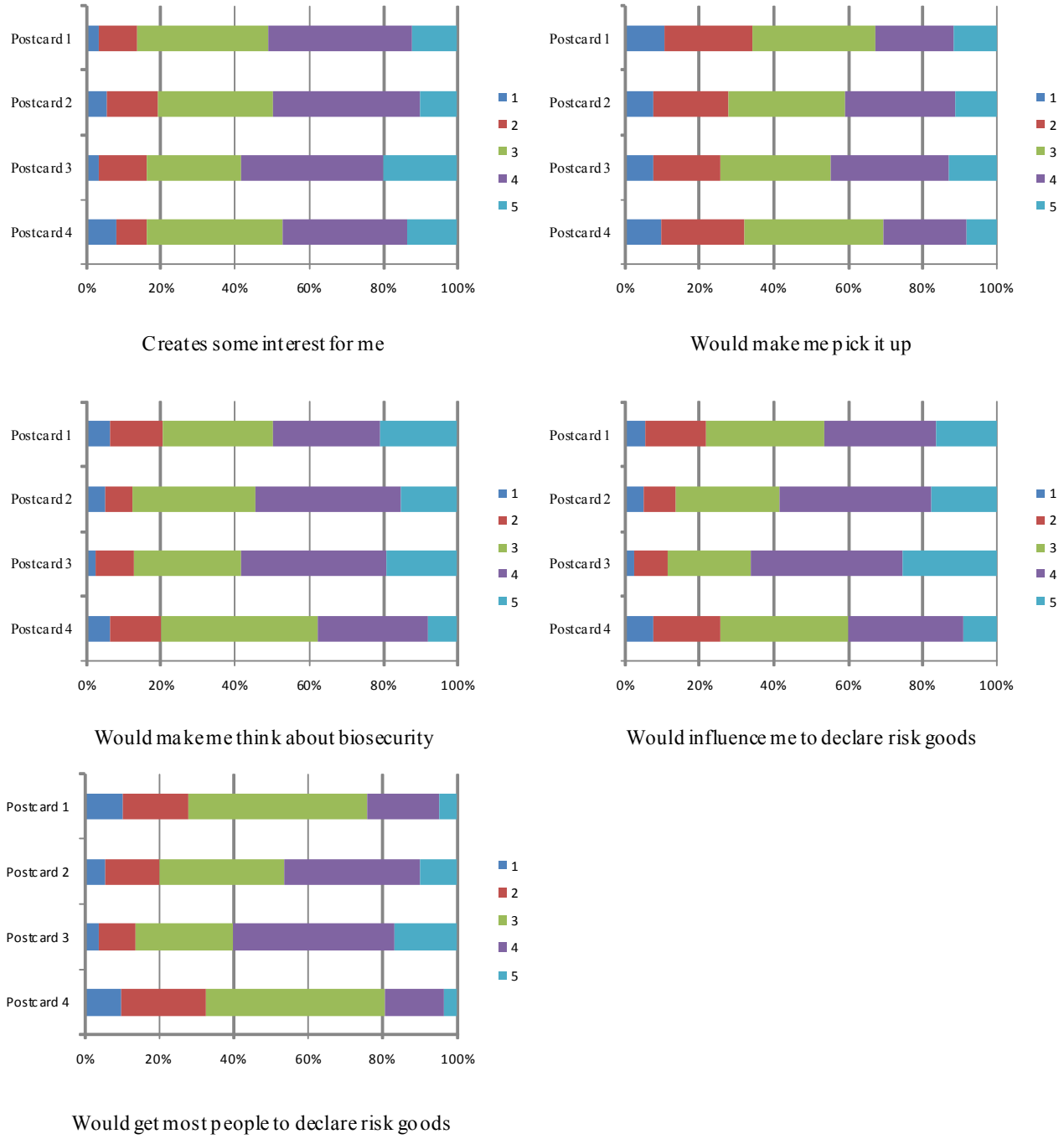

Figure 4.2: Ratings of postcards 1-4 on five criteria, where 1=strongly disagree, and 5=strongly agree

4.8 Level of involvement and response to postcards

The data were analysed to determine whether there were any differences in the response to each individual postcard based on level of involvement. There were some differences in the response to each postcard when comparing those who had a medium level of involvement to those with a higher level of involvement. In Table 4.17 scores for each postcard from respondents with medium levels of involvement are outlined. Respondents with medium involvement rated the postcards neutrally, although Postcard 3 was rated slightly more favourably. Postcard 3 was rated significantly more favourably than Postcard 1 on two criteria; 'would make me pick it up' and 'would get more people to declare risk goods'. Postcard 3 was rated significantly more favourably than Postcard 4 on the criterion 'would influence me to declare risk goods'.

Table 4.16: Mean scores for postcards 1 – 4 amongst respondents with medium involvement, where 1=strongly disagree and 5=strongly agree

	Postcard 1	**Postcard 2**	**Postcard 3**	**Postcard 4**
Creates some interest for me	3.2	3.0	3.3	3.1
Would make me pick it up	2.4*	2.7	3.0*	2.7
Would make me think about biosecurity	2.9	2.9	3.0	2.8
Would influence me to declare risk goods	3.1	3.0	3.4**	2.6**
Would get most people to declare risk goods	2.4^	2.8	3.1^	2.6

* Significant difference between postcards, P=0.044
** Significant difference between postcards, P=0.021
^ Significant difference between postcards, P=0.019

In Table 4.18 the scores for each postcard from respondents with high levels of involvement are outlined. Again, respondents tended to rate each postcard relatively neutrally. There were some significant differences between postcards. Postcard 3 was rated significantly more favourably than Postcard 4 on three criteria; 'would make me think about biosecurity', 'would influence me to declare risk goods' and ' would get most people to declare risk goods'.

Table 4.17: Mean scores for postcards 1 – 4 amongst respondents with high involvement, where 1=strongly disagree and 5=strongly agree

	Postcard 1	Postcard 2	Postcard 3	Postcard 4
Creates some interest for me	3.4	3.4	3.6	3.4
Would make me pick it up	3.0	3.2	3.1	3.0
Would make me think about biosecurity	3.4	3.6	3.6*	3.2*
Would influence me to declare risk goods	3.3	3.6	3.8**	3.2**
Would get most people to declare risk goods	3.0	3.4	3.7^	2.8^

* Significant difference between postcards, P=0.001
** Significant difference between postcards, P=0.000
^ Significant difference between postcards, P=0.000

In Table 4.19 the scores for each postcard from respondents with very high levels of involvement are outlined. Generally the postcards were rated more positively by respondents with a very high level of involvement, with a greater level of agreement with each criterion. Postcard 3 was rated significantly more favourably than Postcard 4 on two criteria, 'would make me pick it up' and 'would make me think about biosecurity'. Postcard 3 was rated significantly more favourably than Postcard 2 on the criterion 'creates some interest for me'. Postcard 3 was also rated significantly more favourably than Postcard 1 on the criterion 'would get most people to declare risk goods'.

Table 4.18: Mean scores for postcards 1 – 4 amongst respondents with very high involvement, where 1=strongly disagree and 5=strongly agree

	Postcard 1	Postcard 2	Postcard 3	Postcard 4
Creates some interest for me	3.9	3.7*	4.1*	3.8
Would make me pick it up	3.4	3.5	3.8**	3.3**
Would make me think about biosecurity	4.1	4	4.1^	3.7^
Would influence me to declare risk goods	3.7	4	4.1	3.7
Would get most people to declare risk goods	3.1#	3.6	3.9#	3.1

* Significant difference between postcards, P=0.045
**Significant difference between postcards, P=0.024
^ Significant difference between postcards, P=0.043
# Significant difference between postcards, P=0.000

The results, outlined in Tables 4.17 – 4.19 and Figure 4.2, indicate that the negatively framed postcard 3 tended to be the most persuasive in terms of the criteria listed, particularly amongst those respondents with very high involvement. Postcard 3 was designed to have an emotion/entertainment message strategy with a negative framing, i.e. highlighting the fine for not complying with biosecurity requirements. This is consistent with the literature where the more persuasive communications tend to be those where the consequences of not complying are outlined (Levin *et al.,* 1998). However for those who were less involved, in this case respondents with a medium or high level of involvement, the negatively framed postcard 3 did not appear to be as persuasive. This is also consistent with the literature where Maheswaran and Meyers-Levy (1990) concluded that when issue involvement was low, individuals did not process information in detail but looked for positive rather than negative cues.

In the next chapter the implications of these results and fit with the literature are discussed.

Chapter 5: Discussion of results

"*The significance of conditions of low or high involvement is not that one is better than the other, but that the processes of communication impact are different.*" (Krugman, 1965, p. 355).

5.1 Involvement and communication efforts

The aims of the research outlined in this thesis were to understand whether people were involved in New Zealand biosecurity and whether information could be framed in a way that would create involvement in biosecurity and a willingness to declare risk goods. Involvement influences the extent of information search, the length of the decision-making process, and the formation of attitudes (Vermeir & Verbeke, 2006). Information has the potential to influence knowledge, attitudes and decision-making (Verbeke, 2008). However, providing more information does not necessarily mean that individuals will be better informed as information is only likely to be effective when it addresses specific needs and can be adequately processed (Verbeke, 2008). To carry out the research, an involvement scale was used to measure individual involvement in the issue of biosecurity and a series of four postcards, each presenting information on biosecurity but framed differently (informative versus emotional versus social norms), was used to determine whether varying the way in which the information was framed influenced the effectiveness of the information provided.

5.2 Measuring involvement in biosecurity

The scale used to measure involvement in this issue was a scale originally developed for consumer products. However Mittal's (1995) involvement scale, a revision of the PII

developed by Zaichkowsky (1985), appeared to provide a robust measure of the level of involvement in an issue, in this case biosecurity. The results of this study indicate that respondents were highly involved in biosecurity. This level of involvement was validated via participants' response to a range of statements about biosecurity, indicating they were concerned about biosecurity and felt it was important. Respondents' background also indicated they should be involved with biosecurity, with two thirds working in industries that had potential links to biosecurity issues and over a third indicating they dealt with biosecurity issues at work. Younger people appeared to be more involved in biosecurity. It is not entirely clear why this was the case, as research undertaken by UMR indicated that younger people had less knowledge about biosecurity than those over 30 and were less likely to declare risk goods than those over 30 (UMR Research Limited, 2004a).

However, the results of this study also indicate that there were differences between involvement in the issue of biosecurity and involvement in products. Much of the literature on involvement centres on products and advertising and suggests that those who are highly involved should allocate time and effort to searching for information in order to make a decision about a product or issue, for example by reading widely or seeking information from experts (Assael *et al.,* 2007; Celsi & Olson, 1988; Flynn & Goldsmith, 1993; Lee, Herr, Kardes, & Kim, 1999; Zaichkowsky, 1994). Respondents in this study indicated that the amnesty bins and arrival card were the most widely recalled biosecurity information. Those who were highly involved in biosecurity did not indicate they read or took note of more information than those who were less involved. However, highly involved respondents did rate some biosecurity information differently to those who were less involved. For example, very highly involved respondents felt that the arrival card was more useful than those who were less involved. Very highly involved respondents were also significantly more likely to

indicate that some of the information, such as video shown on the plane, did not change their mind about declaring risk items.

There is some evidence in the literature to suggest that once attitudes are formed, individuals who are highly involved are less likely to process information that is counter to those attitudes (Park, Levine, Westerman, Orfgen, & Foregger, 2007). However while attitudes are being formed, highly involved individuals are more likely to take note of information relevant to the issue or product (Park *et al.*, 2007; Priluck & Till, 2004). The implication for the results of this study is that very high involvement respondents had already formed beliefs and attitudes about New Zealand biosecurity requirements and so were not inclined to take notice of the information provided to them as they came back into the country. This suggests that these individuals already felt they knew what they needed to do to comply with biosecurity requirements.

The situation of only limited information search under high involvement conditions is not unique and has been explored by Moorthy, Ratchford, and Talukdar (1997). They presented evidence to suggest why the relationship between the amount of search and experience with the product can be an inverted U shape, as illustrated in Figure 5.1. In their analysis, the consumer becomes more like an expert as experience increases, decreasing the cost of searching for information, while increasing the opportunity cost of time (Moorthy *et al.*, 1997). Travellers in our sample had apparently decided that they had gathered enough information to be able to meet the biosecurity requirements and so the opportunity cost of further information search was high, given they felt the environment was stable and the requirements were not expected to change dramatically.

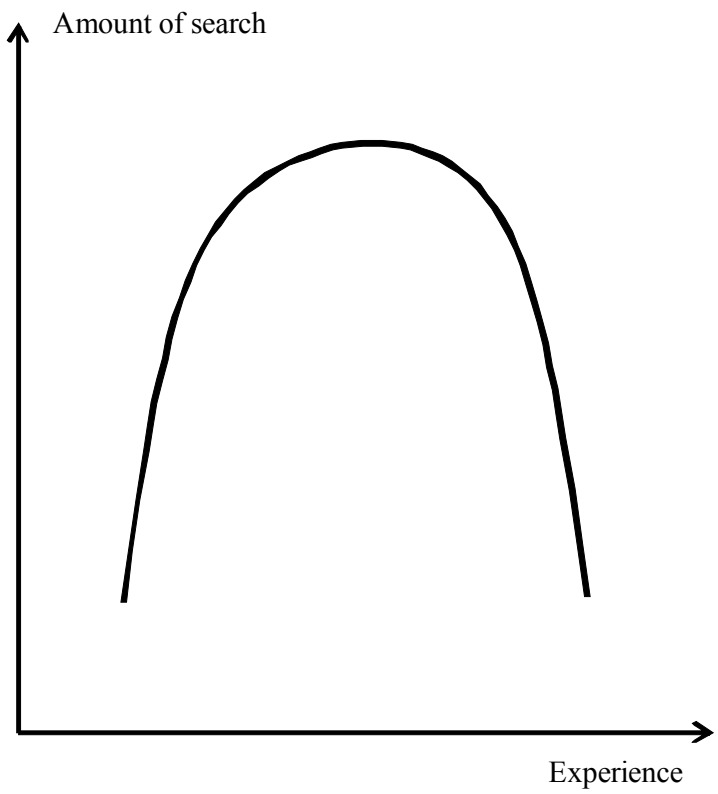

Figure 5.1: Effect of experience on amount of search, adapted from Moorthy *et al.* (1997)

This type of behaviour, limited search for information under high involvement conditions, is exemplified in the consumer decision making process of brand loyalty. Brand loyalty is characterised by high involvement but less effort put into information search, as outlined in Table 5.1 (Assael *et al.,* 2007). As consumers become more experienced with a product or product class, loyalty tends to increase and information search decreases (Ratchford, 2001). Brand loyalty tends to occur when a purchase decision is considered risky, or is a source of self identification, such as when buying a vehicle or house (Assael *et al.,* 2007; Richins, Bloch, & McQuarrie, 1992). Assael *et al.* (2007), p. 127 describe brand loyalty as instrumental conditioning, "*positive reinforcement based on satisfaction with the brand, leading to repetitive behaviour*." The results of the research outlined in this paper appear to suggest that respondents were exhibiting a type of brand loyal behaviour with regard to biosecurity, stemming from enduring involvement with the issue.

Table 5.1: An outline of the four types of decision making, highlighting brand loyalty

	High involvement	**Low involvement**
Decision making (High effort)	Complex decision making	Limited decision making
Habit (Low effort)	***Brand loyalty***	Inertia

Adapted from Assael *et al.* (2007)

Enduring involvement has been explored to some extent in the literature, including the impact on the search for information over time. Research on involvement in leisure activities would suggest that individuals can have enduring involvement in recreation behaviour such as camping (McIntyre, 1989). Research on involvement in food has revealed that although traditionally assumed to be a low involvement product, some individuals exhibit high and enduring involvement in this product category (Verbeke & Vackier, 2004). Verbeke and Vackier (2004) found that consumers of meat had varying levels of involvement in that product. Although all were concerned about tangible qualities such as taste, consumers with high involvement were also concerned about intangible characteristics of the product such as quality in relation to health and food safety. Some consumers have enduring involvement in food, perhaps because of their concerns about food safety, as mentioned above, or because of a perceived need to support sustainable food production (Vermeir & Verbeke, 2006). While involvement in food continues to be high over time, this may not necessarily translate into an extensive search for information and processing. For example, once a product is found that meets the criteria required, the consumer simply continues to purchase this product and there is little need for any extra information.

To some extent, with regard to biosecurity, this type of behaviour is desirable. Travellers who have put time and effort into finding out about the biosecurity requirements for New Zealand,

and then follow those requirements will present the least risk of biosecurity incursions. However, there is a danger that those individuals who are highly involved may have an unfavourable reaction to the biosecurity requirements presented. Under these circumstances there is the possibility that they then may actively work to try and avoid the biosecurity requirements. This type of behaviour has been highlighted by Murdoch *et al.* (2009) in their exploration of people's response to regulations.

Another undesirable aspect to brand loyal behaviour is that individuals may not become aware of changes to the biosecurity requirements since they do not perceive any need to gather further information and as a result may not take notice of any changes. This could be a problem, depending on the change in the requirements. Being able to signal to highly involved travellers that they need to pay attention to some new information could be an important part of ensuring that they remain a low risk group.

5.3 Types of high involvement

Illies and Reiter-Palmon (2004) suggested that the type of high involvement experienced, i.e. outcome- or value-relevant involvement, would determine the extent of information search as well as the quality of solutions to a problem. Value-relevant involvement is linked to ego involvement and is created when attitudes linked to values are activated (Cho & Boster, 2005; Johnson & Eagly, 1989). Outcome-relevant involvement is the linking of personal goals or outcomes to an issue (Cho & Boster, 2005). Illies and Reiter-Palmon (2004) concluded that high outcome-relevant involvement increased information search and the quality of the solutions developed for a problem. However, high value-relevant involvement generated some increase in search for information but did not result in high quality solutions. This was consistent with earlier research on the quality of solutions generated under high

involvement conditions (Lee *et al.,* 1999; Maio & Olson, 1995; Takemura, 1994). If involvement in biosecurity was considered to be more related to value-relevant involvement than outcome-relelvant involvement then the results from this study are similar to that of Illies and Reiter-Palmon (2004).

Biosecurity could invoke a value based response in individuals, by linking the impact of biosecurity to New Zealand's environment, the impact on the economic situation of individuals, particularly those working in industries that deal with biosecurity issues, and impacts on human health. Any of these areas could provoke a value response. The scale used in this study to measure involvement in biosecurity did not provide an indication of the source of the involvement in biosecurity which would have helped determine whether value involvement had been invoked. Other scales could be used in the future to determine source of involvement. Alternatively, qualitative data gathering, through focus groups or interviewing could be used to elicit source of involvement, as Aldoory (2001) did in her work exploring women's responses to health communications.

5.4 Reframing information

The results of this study indicate that framing information on biosecurity differently does have an impact on the way in which individuals perceive that information. The negatively framed postcard (Postcard 3) was generally considered to be the most persuasive. In addition, involvement in the issue also had an impact, as individuals with very high involvement tended to be more persuaded by the negatively framed postcard than those with medium or high involvement in biosecurity.

The research on message framing tends to be inconclusive (Kim, 2006; Levin *et al.,* 1998). In an attempt to reconcile some of the findings, researchers have explored the effects of

involvement, (Maheswaran & Meyers-Levy, 1990), the motivation to process information and the opportunity to process information (Shiv *et al.,* 2004) on responses to message framing. In addition Levin *et al.* (1998) proposed three types of framing manipulations to organise and interpret past framing research that appeared to be contradictory.

Some of the literature indicates that highly involved individuals will be more persuaded by negative framing (Maheswaran & Meyers-Levy, 1990). Maheswaran and Meyers-Levy (1990) proposed that individuals with high involvement assigned a greater weight to negatively framed information and therefore were more persuaded by it. Shiv *et al.* (2004) found that when individuals were highly motivated to process information, negative framing was more persuasive, irrespective of the opportunity to process that information. The results of this study indicated that individuals who were highly involved were not always inclined to spend time processing information even though, by being highly involved, they should be motivated to process information on the issue.

The results outlined by Shiv *et al.* (2004) would appear to be most relevant to the issue of biosecurity. Travellers are provided with information on biosecurity at various times (e.g. on the plane or in the arrivals hall) but the opportunity to process that information may be low. Travellers arriving into a New Zealand airport are trying to clear customs/passport control, find their baggage and will be thinking about their holiday or return home and the activities this entails. This is not a situation in which there is a lot of opportunity to process extra information on biosecurity. For highly involved travellers, a reminder of the importance of biosecurity by highlighting the fines for not complying with biosecurity requirements may be all that is needed to ensure that they declare any risk goods they have. However, this may not be the case for those who are less involved.

Those individuals who have low involvement in biosecurity will perceive less risk associated with this issue and will be less motivated to process information (Chaffee & Roser, 1986). Kim (2003) suggests that an affect evoking strategy, i.e. one that uses emotion to generate attention, would be the most effective means of gaining the attention of individuals with low involvement. Similarly Gregory (2006), in the context of health education, suggested using an emotion/entertainment message strategy to gain the attention of individuals who were not looking for information.

Zaichkowsky (1986) depicted involvement as a function of the person, object and situation. The results of this research indicate that involvement in biosecurity can be viewed similarly. In Figure 5.2, involvement in biosecurity is depicted and the results of high involvement illustrated.

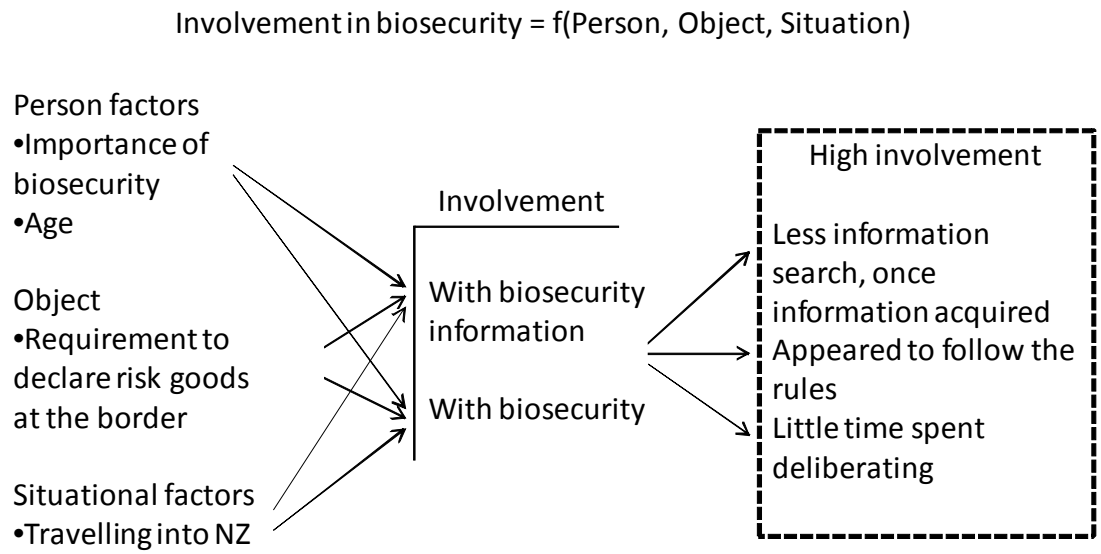

Figure 5.2: Involvement in biosecurity, highlighting the results of high involvement obtained from the research outlined in this thesis (adapted from Zaichkowsky, 1986)

5.5 Limitations

One of the key limitations of this research was that the sample was small and consisted of respondents involved in agriculture and land based industries. Most respondents had a high level of involvement in biosecurity. Thus the results can only provide a detailed understanding of high involvement in biosecurity amongst individuals from this sector. The survey was not designed to obtain a representative sample from the agriculture and land based industries. However, there is no reason to suspect that the information is not representative of individuals in this sector.

Obtaining responses from individuals with low involvement is difficult. By definition individuals with low involvement are less engaged and less inclined to seek out information (Illies & Reiter-Palmon, 2004) and so may not be inclined to respond to a survey. The authors of one of the few studies on involvement and response to surveys concluded that high involvement in a topic led to a higher response rate, however the speed of response did not differ (Van Kenhove, Wijnen, & De Wulf, 2002). Others have speculated that willingness to respond to a survey could be an indicator of high involvement (Kinard & Capella, 2006). This does suggest that providing incentives or rewards would be a means of obtaining responses from individuals with low involvement in the issue. No incentives or rewards were offered to potential participants in this research.

A second limitation of this research is that respondents were asked to recall the information on biosecurity that they had seen when coming back into New Zealand sometime in the last year. Self reported recall of information can be problematic, both in terms of under reporting and over reporting of information recalled. If individuals believe that their answers could

reflect a negative image then over or under reporting can be an issue. Kopcha and Sullivan (2007) found that teachers tended to report greater personal use of a range of teaching practices in the classroom than actually occurred. Research into food intake tends to have an under reporting bias as individuals either do not wish to be noted as consuming more food than average, or because they alter their diet during the period they are surveyed (Cook, Pryer, & Shetty, 2000; Pryer, Vrijheid, Nichols, Kiggins, & Elliott, 1997). In addition memories about oneself can tend to be inflated or elevated, exaggerating current performance (Gramzow & Willard, 2006; Willard & Gramzow, 2008). Some or all of the issues outlined could have influenced the response of individuals, and thus the results of the research outlined in this thesis.

A third limitation to this study is that the source of involvement in biosecurity was not able to be explored because involvement was treated as a single dimension construct and measured using a quantitative scale. Mittal's (1995) revision of the PII was used to produce a one dimensional measure of involvement which was easy to administer in a survey. However other researchers such as Michaelidou and Dibb (2006) have highlighted the need to consider the different dimensions of involvement identified by Kapferer and Laurent (1985). Some researchers have successfully used a qualitative approach to exploring involvement and sources of involvement or have used longer quantitative involvement scales. Aldoory and Van Dyke's (2006) study used qualitative methods to explore involvement and response to a bioterrorism attack on food supplies. They found that highly involved participants were more inclined to talk about searching for information and were able to identify factors that increased involvement in this issue. Taking a quantitative approach, Michaelidou and Dibb (2006) were able to identify different sources of involvement in clothing from responses to a 15 item involvement scale that was part of a web based survey.

A fourth limitation was that the design of the postcards was limited to three generic communication strategies. In addition, only one of the postcards included details of a fine. This means that individuals' response to a larger or smaller fine could not be ascertained, as well as individuals' response to variations within these generic approached to communication on biosecurity.

5.6 Summary

In this chapter the results of research designed to understand whether people were involved in New Zealand biosecurity and whether information could be framed in a way that would create involvement in biosecurity and a willingness to declare risk goods were discussed. The results of this study indicate that respondents were highly involved in biosecurity, and were likely to indicate that the negatively framed postcard was the most persuasive. In the final chapter the implications of these results are outlined.

Chapter 6: Future research and conclusion

"*In the 19th and early 20th century, travel to New Zealand was slow and expensive; exotic species intended for introduction often had to be carefully nurtured during the sea journey. In the latter half of the 20th century, air travel and sea containers have revolutionized the speed and efficiency with which goods and people are moved around the world and made it easier for unintended organisms to hitchhike*" (Jay & Morad, 2006, p. 297).

6.1 Overview

Historically, New Zealand's isolation has made it difficult for exotic pests and diseases to enter the country (Jay & Morad, 2006). However as trade and travel have increased, so has the risk of biosecurity incursions (Kriticos *et al.,* 2005). Individuals have been identified as one pathway for incursions (Forer & McNeill, 2008) and so there is a requirement that all individuals must declare any biosecurity risk goods before entering New Zealand. Individual response to this requirement will determine behaviour.

Traditional economic approaches to understanding individual behaviour in response to a regulation are based on deterrence theory and rational choice (Frank, 1987; Winter & May, 2001). However these approaches are somewhat limited in their ability to predict response when individuals do not act purely out of self interest (Frank, 1987; Sutinen & Kuperan, 1999). A different approach is called for (Murdoch *et al.,* 2009; Sutinen & Kuperan, 1999; Winter & May, 2001).

The approach used in the research outlined in this thesis was to use the concept of involvement to help put individual behaviour into perspective. Involvement is defined as a measure of the intensity of an individual's motivation in regard to a decision (Verbeke & Vackier, 2004). If a person is highly involved they will put time and effort into forming an attitude. If they are not involved, while they may be able to express an attitude, it may not be particularly reflective of their behaviour (Murdoch *et al.,* 2009). Understanding an individual's involvement in an issue should provide some information on how strongly their attitudes are held and whether their attitudes will be a good predictor of their behaviour. Involvement has been shown to regulate the way in which people receive and process information (Heath & Douglas, 1991; Salmon, 1986), and therefore is perceived to be important for designers of information and communication campaigns as involvement will provide some indication of how audiences may respond to the information provided (Gregory, 2004; Kim, 2003).

The research questions addressed in this research were:

1. What is the level of involvement with New Zealand biosecurity requirements?
2. Does varying the way in which the information is framed influence the effectiveness of the information provided?

To address the first question, an involvement scale was applied to the issue of biosecurity to determine whether it was possible to measure involvement in biosecurity. To address the second question, differently framed information on biosecurity was presented in order to determine whether this made a difference to the response of individuals to that information. A web based survey was used to collect data from individuals who had travelled overseas in the last 12 months. A total of 134 responses were received from a range of individuals, heavily

weighted towards those who worked or were associated with agriculture and land based industries.

The results indicate that it was possible to measure involvement in biosecurity using an involvement scale. Generally, individuals in the sample obtained were highly involved in biosecurity. This was confirmed through their response to a range of other statements indicating that they felt biosecurity was important and they were concerned about it. However, those who were highly involved in biosecurity did not appear to take more notice of information, compared to those who were less involved, although there were some differences between respondents in terms of their rating of biosecurity information. The results also indicated that negatively framed information tended to be the most persuasive.

There is some evidence in the literature to suggest that while attitudes are being formed, individuals are more likely to take notice of information on an issue (Park *et al.,* 2007; Priluck & Till, 2004), however, once attitudes are formed individuals who are highly involved are less likely to process information that is counter to those attitudes (Park *et al.,* 2007). In addition, Shiv, Edell Britton, and Payne (2004) found that when individuals were highly motivated to process information, framing that information in a negative way was more persuasive, irrespective of the opportunity to process that information. The results of this study indicated that very highly involved respondents had already formed beliefs and attitudes about New Zealand biosecurity requirements and so demonstrated limited search for further information. However, they could be reminded of the need to comply with biosecurity requirements with information that highlighted the consequences of not complying with the requirements.

6.2 Implications

There are several implications of the results of this research into individuals and their response to New Zealand biosecurity requirements. The first implication is that highly involved individuals had an understanding of New Zealand biosecurity requirements and the implications of not meeting those requirements. In many respects, this demonstrates that the time and effort that has been put into the design and delivery of information to travellers has been working (Rauniyar *et al.,* 2000; Rauniyar *et al.,* 1999; Whyte, 2005), at least for those individuals who feel that biosecurity is important.

The nature of the sample of respondents in this study has meant that the response of individuals with low involvement could not be elicited. Marketers emphasise the need to have a different strategy for gaining the attention of individuals with low involvement (Assael *et al.*, 2007). Assael *et al.* (2007) suggest that repetition, focussing on a few key points, and emphasising visual components are keys to attracting the attention of low involvement consumers. In addition Kim (2003) suggested an affect-evoking strategy, particularly the use of fear, was the most effective means of attracting the attention of individuals with low involvement. Kim (2003) also suggested an alternative strategy, cue-emphasising, when enduring involvement was low, but situational involvement was high. Individual's response to biosecurity could be in this category, as having to answer questions about biosecurity and have baggage x-rayed could evoke situational involvement in the issue. In these circumstances Kim (2003) suggests using a celebrity to emphasise the need to declare biosecurity risk goods.

Interestingly, until recently, this had been the approach taken by the Australian biosecurity authorities. Steve Irwin was the public face of the 'Quarantine Matters' communication campaign from 2002 (Smitz, Ashworth, & Bedford, 2004; Thompson, Stenekes, Kruger, & Carr, 2009). In this campaign Steve Irwin discussed the need to declare biosecurity risk goods in order to protect Australian flora and fauna, and emphasised that the authorities would find risk goods if individuals did not declare them. This combined both the affect-evoking and cue-emphasising strategies outlined by Kim (2003). Steve Irwin's death prevented this campaign from continuing, although there has been some disagreement about its effectiveness (Thompson *et al.,* 2009).

An alternative, longer term, strategy is to try and increase the level of involvement in biosecurity. Roth (1994), in his work exploring involvement in health care, emphasised the need to invoke trust, control and empowerment in individuals as a means of increasing their involvement. In the health care situation this meant increasing the means by which individuals could have contact with, and obtain information from, health care professionals. Assael *et al.* (2007) also recommended a number of methods for increasing involvement in the context of consumer goods, including considering linking the issue to another, more involving issue or situation. For biosecurity this could mean focussing more on the economic or environmental impacts of biosecurity, depending on which is important to an individual. The participants in this research tended to be involved in agriculture or be associated with primary industries. Biosecurity incursions can have a devastating impact on these industries so linking the importance of declaring risk goods at the border to protecting an industry from the impact of a biosecurity incursion could increase involvement. For others, the impact of a biosecurity incursion on their experience of the natural environment could help increase their level of involvement in this issue.

The second implication arising from the research outlined in this thesis was that those individuals highly involved in biosecurity could reach a point at which they felt they did not need to process more information on this issue. This is not necessarily a problem. It means that most of these individuals should understand biosecurity requirements and follow them. However, it is an issue if the biosecurity requirements change. Ensuring that these high involvement individuals take note of new information could prove difficult, especially if they believe they already know what is required. Providing information to people when they have limited their information search to some extent resembles low involvement behaviour. In these circumstances the strategies outlined above will also be relevant if there is a need to try and regain individuals' attention.

The third implication arising from this research was that reframing information on biosecurity has the potential to increase the effectiveness of information on this issue. This suggests that it is important to screen and test information designed to provide information on biosecurity to ensure that it is framed in a way that will increase attention and be persuasive. The results of this research suggest that highly involved participants will take note of, and be persuaded by negatively framed information.

Finally, this research demonstrates that understanding involvement in an issue can provide significant information on individual's behaviour in regard to that issue. As such this research has added to the knowledge of involvement through increasing the understanding of factors which drive attitude formation and development. Krugman (1965, p. 355), quoted at the beginning of chapter 5, said, "*The significance of conditions of low or high involvement is not that one is better than the other, but that the processes of communication impact are*

different", succinctly summing up the significance of involvement, i.e. important to know so that you can target information to your audience effectively.

6.3 Future research

There are a number of opportunities for further research based on the results outlined here. Firstly, there is a need to determine the source of involvement in biosecurity. Potential sources of involvement are; interest, pleasure, sign, and risk (Kapferer & Laurent, 1985; Laurent & Kapferer, 1985). Interest refers to the consequence of a decision in terms of perceived practical, functional and economic outcomes. Pleasure and sign refer to the consequences of a decision; satisfying the need for pleasure and the impact on an individual's self-image. An individual's perception of the risks will also influence the level of involvement. Source of involvement in biosecurity could be obtained through the use of an alternative scale for measuring involvement that provides this level of detail, or through an in-depth interviewing approach which allows the researcher to explore issues in depth.

Secondly, there is a need to determine the type of involvement in biosecurity, i.e. value-, outcome- and impression-relevant involvement (Cho & Boster, 2005; Johnson & Eagly, 1989; Maio & Olson, 1995). Value–relevant involvement is linked to ego involvement and is created when attitudes linked to values are activated. Outcome-relevant involvement is the linking of personal goals or outcomes to an issue. Impression-relevant involvement is linked to concern over public perception of self.

Thirdly, there is a need to determine whether it is possible to increase the level of involvement in an issue. Some experimental work is required, to test some of the strategies outlined above in order to ascertain whether they are viable in the context of an issue as

opposed to a consumer product. This could include exploring the role of trust, control and empowerment in increasing the level of involvement in biosecurity.

Fourthly, the study could be extended by surveying a larger sample of the New Zealand population to determine whether there are any differences in the results and thus the requirements for successful design and communication of biosecurity information. The study could also be extended to other groups, for example, foreign tourists, or subsets of tourists such as trampers, or bus tour participants, to explore their level of involvement in biosecurity. The study could also be extended by expanding the range of communication strategies, including varying the level of fines to determine individuals' response to changes in the penalty for not declaring risk goods.

6.4 Conclusion

The New Zealand biosecurity system has been designed to exclude, eradicate or manage the risks posed by pests or diseases to the economy, environment and human health (Biosecurity Council, 2003). People are a fundamental part of the system, representing both an opportunity and challenge. The research outlined in this thesis was designed to explore a small part of the biosecurity system, individuals' response to New Zealand biosecurity requirements. The results indicate that highly involved individuals have taken note of, and appear to respond to the biosecurity requirements at the border. Successful communication with this group of people means highlighting when the requirements may have changed and so when they need to take note of the information provided. This could take the form of highlighting the consequences of not adhering to the biosecurity requirements, and providing details of any changes in requirements. Effectively communicating to individuals with low involvement appears to be more of a challenge. Attempting to increase their level of involvement could be

a potential strategy however more research is needed to determine the most appropriate means of doing this.

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References

Akers, R. L. (1990). Rational Choice, Deterrence and Social Learning Theory in Criminology: The Path Not Taken. *The Journal of Criminal Law and Criminology, 81*(3), 653-676.

Aldoory, L. (2001). Making health communications meaningful for women: Factors that influence involvement. *Journal of Public Relations Research, 13*(2), 163-185.

Aldoory, L., & Van Dyke, M. A. (2006). The roles of perceived "shared" involvement and information overload in understanding how audiences make meaning of news about bioterrorism. *Journalism and Mass Communication Quarterly, 83*(2), 346-361.

Andreu, J., Vilà, M., & Hulme, P. E. (2009). An Assessment of Stakeholder Perceptions and Management of Noxious Alien Plants in Spain. *Environmental Management 43*(6), 1244-1255.

Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic Survey Methodology: A Case Study in Reaching Hard-to-Involve Internet Users. *International Journal of Human-Computer Interaction, 16*(2), 185 - 210.

Andrews, J. C., Durvasula, S., & Akhter, S. H. (1990). A framework for conceptualizing and measuring the involvement construct in advertising research. *Journal of Advertising, 19*(4), 27-40.

Antil, J. H. (1984). Conceptualization and operationalization of involvement. *Advances in Consumer Research, 11*(203-209).

Assael, H., Pope, N., Brennan, L., & Voges, K. (2007). *Consumer Behaviour* (Asia-Pacific ed.). Milton, Queensland: John Wiley and Sons.

Bell, R., & Marshall, D. W. (2003). The construct of food involvement in behavioural research: Scale development and validation. *Appetite, 40*(3), 235-244.

Bienstock, C. C., & Stafford, M. R. (2006). Measuring involvement with the service: A further investigation of scale validity and dimensionality. *Journal of Marketing Theory and Practice, 14*(3), 209-221.

Biosecurity Council. (2003). *Tiakina Aotearoa. Protect New Zealand. The biosecurity strategy for New Zealand*.

Biosecurity New Zealand. (n.d.). About us. Retrieved October 27, 2006, from http://www.biosecurity.govt.nz/about-us/about-us

Birnbaum, M. H. (2004). Human research and data collection via the internet. *Annual Review of Psychology, 55*, 803-832.

Brasier, C. M. (2008). The biosecurity threat to the UK and global environment from international trade in plants. *Plant Pathology, 57*(5), 792 - 808.

Celsi, R. L., & Olson, R. G. (1988). The role of involvement in attention and comprehension processes. *Journal of Consumer Research, 15*(2), 210-224.

Chaffee, S. H., & Roser, C. (1986). Involvement and the consistency of knowledge, attitudes, and behaviours. *Communication Research, 13*(3), 373-399.

Chandrashekaran, R., & Grewal, D. (2003). Assimilation of advertised reference prices: the moderating role of involvement. *Journal of Retailing, 79*(1), 53-62.

Cho, H., & Boster, F. J. (2005). Development and validation of value-, outcome-, and impression-relevant involvement scales. *Communication Research, 32*(2), 235-264.

Cialdini, R. B., Demaine, L. J., Sagarin, B. J., Barrett, D. W., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social Influence, 1*(1), 3-15.

Cook, A., Pryer, J., & Shetty, P. (2000). The problem of accuracy in dietary surveys. Analysis of the over 65 UK National Diet and Nutrition Survey. *Journal of Epidemiology and Community Health, 54*(8), 611-616.

Derbaix, C., & Vanden Abeele, P. (1985). Consumer inferences and consumer preferences. The status of cognition and consciousness in consumer behavior theory. *International Journal of Research in Marketing, 2*(3), 157-174.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., & Bohlen, G. M. (2003). Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *Journal of Business Research, 56*(6), 465-480.

Dimanche, F., Havitz, M. E., & Howard, D. R. (1991). Testing the Involvement Profile (IP) Scale in the Context of Selected Recreational and Touristic Activities. *Journal of Leisure Research, 23*(1), 51-.

Donovan, R. J., & Jalleh, G. (1999). Positively versus negatively framed product attributes: The influence of involvement. *Psychology and Marketing, 16*(7), 613-630.

Fazio, R. H., & Olsen, M. A. (2003). Attitudes: Foundations, functions, and consequences. In M. A. Hogg & J. Cooper (Eds.), *The Sage Handbook of Social Psychology*. London: Sage.

Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Fleming, C. M., & Bowden, M. (2009). Web-based surveys as an alternative to traditional mail methods. *Journal of Environmental Management, 90*(1), 284-292.

Flynn, L. R., & Goldsmith, R. E. (1993). Application of the personal involvement inventory in marketing. *Psychology and Marketing, 10*(4), 357-366.

Forer, P. C., & McNeill, M. R. (2008). Tourist flows, lagged arrivals and environmental consonance as factors in biological exchange risk in Aotearoa New Zealand. In K. J. Froud, A. I. Popay & S. M. Zydenbos (Eds.), *Surveillance for Biosecurity: Pre-Border to Pest Management* (pp. 19-28). Hastings: New Zealand Plant Protection Society Incorporated.

Frank, R. H. (1987). If Homo Economicus could choose his own utility function, would he want one with a conscience? *The American Economic Review, 77*(4), 593-604.

Gabbott, M., & Hogg, G. (1999). Consumer involvement in services: A replication and extension. *Journal of Business Research, 46*(2), 159-166.

García-Llorente, M., Martín-López, B., González, J. A., Alcorlo, P., & Montes, C. (2008). Social perceptions of the impacts and benefits of invasive alien species: Implications for management. *Biological Conservation, 141*(12), 2969-2983.

Gardner, M. P., Mitchell, A. A., & Russo, J. E. (1985). Low Involvement Strategies for Processing Advertisements. *Journal of Advertising, 14*(2), 4-12.

Glasman, L. R., & Albarracín, D. (2006). Forming attitudes that predict future behavior: A meta-analysis of the Attitude-Behavior relation. *Psychological Bulletin, 132*(5), 778-822.

Goldson, S. L., Rowarth, J. S., & Caradus, J. R. (2005). The impact of invasive invertebrate pests in pastoral agriculture: A review. *New Zealand Journal of Agricultural Research, 48*(4), 401-415.

Goldstein, N. J., Griskevicius, V., & Cialdini, R. B. (2007). Invoking social norms: A social psychology perspective on improving hotels' linen-reuse programs. *Cornell Hotel and Restaurant Administration Quarterly, 48*(2), 145-150.

Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59*(2), 93-104.

Gramzow, R. H., & Willard, G. (2006). Exaggerating Current and Past Performance: Motivated Self-Enhancement Versus Reconstructive Memory. *Personality and Social Psychology Bulletin, 32*(8), 1114-1125.

Greenwald, A. G., & Leavitt, C. (1984). Audience involvement in advertising: Four levels. *Journal of Consumer Research, 11*(June), 581-592.

Gregory, J. (2004). Using audience involvement to guide information design. *Brazilian Journal of Information Design, 1*(1). Retrieved from http://www.infodesign.org.br/v01/ingles/papers/papers_judy01.html.

Gregory, J. (2006). Using message strategy to capture audience attention: Readers' reactions to health education publications. *Journal of Nonprofit & Public Sector Marketing, 15* (1/2), 1 - 23.

Hall, C. M. (2003). Biosecurity and wine tourism: Is a vineyard a farm? *Journal of Wine Research, 14*(2-3), 121-126.

Hall, C. M. (2005). Biosecurity and wine tourism. *Tourism Management, 26*(6), 931-938.

Havitz, M. E., & Dimache, F. (1997). Leisure involvement revisited: Conceptual conundrums and measurement advances. *Journal of Leisure Research, 29*(3), 245-278.

Havitz, M. E., Dimache, F., & Howard, D. R. (1993). A two-sample comparison of the Personal Involvement Inventory (PII) and Involvement Profile (IP) scales using selected recreation activities. *Journal of Applied Recreation Research, 17*(4), 331-364.

Havitz, M. E., & Dimanche, F. (1999). Leisure involvement revisited: Drive properties and paradoxes. *Journal of Leisure Research, 31*(2), 122-149.

Havitz, M. E., & Mannell, R. C. (2005). Enduring involvement, situational involvement, and flow in leisure and non-leisure activities. *Journal of Leisure Research, 37*(2), 152-177.

Heath, R. L., & Douglas, W. (1990). Involvement: A key variable in people's reaction to public policy issues. *Public Relations Research Annual, 2*, 193-204.

Heath, R. L., & Douglas, W. (1991). Effects of Involvement on Reactions to Sources of Messages and to Message Clusters. *Journal of Public Relations Research, 3*(1-4), 179-193.

Hobbs, M. (2000). Instant biosecurity border fines approved. Press release from the Hon. Marion Hobbs, 27/12/2000. Retrieved from http://www.beehive.govt.nz/ViewDocument.aspx?DocumentID=9964

Illies, J. J., & Reiter-Palmon, R. (2004). The effects of type and level of personal involvement on information search and problem solving. *Journal of Applied Social Psychology, 34*(8), 1709-1729.

Jay, M., & Morad, M. (2006). The socioeconomic dimensions of biosecurity: The New Zealand experience. *International Journal of Environmental Studies, 63*(3), 293-302.

Jay, M., Morad, M., & Bell, A. (2003). Biosecurity, a policy dilemma for New Zealand. *Land Use Policy, 20*(2), 121-129.

Johnson, B. T., & Eagly, A. H. (1989). Effects of involvement on persuasion: A meta-analysis. *Psychological Bulletin, 106*(2), 290-314.

Kapferer, J.-N., & Laurent, G. (1985). Consumer involvement profiles: A new practical approach to consumer involvement. *Journal of Advertising Research, 25*(6), 48-56.

Kapferer, J.-N., & Laurent, G. (1993). Further evidence on the consumer involvement profile: Five antecedents of involvement. *Psychology and Marketing, 10*(4), 347-355.

Kim, Y.-J. (2006). The role of regulatory focus in message framing in antismoking advertisements for adolescents. *Journal of Advertising, 35*(1), 143-151.

Kim, Y. (2003). Conceptualizing health campaign strategies through the level of involvement. *Corporate Communications, 8*(4), 255-267.

Kinard, B. R., & Capella, M. L. (2006). Relationship marketing: The influence of consumer involvement on perceived service benefits. *Journal of Services Marketing, 20*(6), 359-368.

Kokkinaki, F., & Lunt, P. (1999). The effect of advertising message involvement on brand attitude accessibility. *Journal of Economic Psychology, 20*(1), 41-51.

Kopcha, T. J., & Sullivan, H. (2007). Self-presentation bias in surveys of teachers' educational technology practices. *Educational Technology Research and Development, 55*(6), 627-646.

Kriticos, D. J., Phillips, C. B., & Suckling, D. M. (2005). Improving border biosecurity: Potential economic benefits to New Zealand. *New Zealand Plant Protection, 58*, 1-6.

Krugman, H. E. (1965). The impact of television advertising: Learning without involvement. *Public Opinion Quarterly, 29* (Fall), 349-356.

Kyle, G., Absher, J., Norman, W., Hammitt, W., & Jodice, L. (2007). A modified involvement scale. *Leisure Studies, 26*(4), 399-427.

Laaksonen, P. (1994). *Consumer involvement. Concepts and research*. London, New York: Routledge.

Larson, M. A., & Massetti-Miller, K. L. (1984). Measuring change after a public education campaign. *Public Relations Review, 10*(4), 23-32.

Laurent, G., & Kapferer, J.-N. (1985). Measuring Consumer Involvement Profiles. *Journal of Marketing Research, 22*(1), 41-53.

Lee, H., Herr, P. M., Kardes, F. R., & Kim, C. (1999). Motivated Search: Effects of Choice Accountability, Issue Involvement, and Prior Knowledge on Information Acquisition and Use. *Journal of Business Research, 45*(1), 75-88.

Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All Frames Are Not Created Equal: A Typology and Critical Analysis of Framing Effects. *Organizational Behavior and Human Decision Processes, 76*(2), 149-188.

Loope, L. L. (2004). New Zealand's border protection quarantine and surveillance: A potential model for Hawai'i. *Ecological Restoration, 22*(1), 69-70.

Mack, R. N., Simberloff, D., Mark Lonsdale, W., Evans, H., Clout, M., & Bazzaz, F. A. (2000). Biotic invasions: Causes, epidemiology, global consequences, and control. *Ecological Applications, 10*(3), 689-710.

MAF Biosecurity New Zealand. (2008). *Pathway analysis annual report 2007-08*: Analysis and profiling group.

MAF Biosecurity New Zealand. (n.d.-a). Detector Dogs - History. Retrieved May 21, 2009, from http://www.biosecurity.govt.nz/biosec/camp-acts/detector-dog/history

MAF Biosecurity New Zealand. (n.d.-b). MAF Biosecurity New Zealand Detector Dog Programme. Retrieved May 20, 2009, from http://www.biosecurity.govt.nz/biosec/camp-acts/detector-dog

Maheswaran, D., & Meyers-Levy, J. (1990). The Influence Of Message Framing And Issue Involvement. *Journal of Marketing Research, 27*(3), 361-367.

Maio, G. R., & Olson, J. M. (1995). Involvement and persuasion: evidence for different types of involvement. *Canadian Journal of Behavioural Science, 27*(1), 64-78.

McCullough, D., Work, T., Cavey, J., Liebhold, A., & Marshall, D. (2006). Interceptions of Nonindigenous Plant Pests at US Ports of Entry and Border Crossings Over a 17-year Period. *Biological Invasions, 8*(4), 611-630.

McIntyre, N. (1989). The personal meaning of participation: enduring involvement. *Journal of Leisure Research, 21*, 167-179.

McQuarrie, E. F., & Munson, J. M. (1987). The Zaichkowsky Personal Involvement Inventory: Modification and extension. *Advances in Consumer Research, 14*, 36-40.

McQuarrie, E. F., & Munson, J. M. (1992). A revised product involvement inventory: Improved usability and validity. *Advances in Consumer Research, 19*(108-115).

Meyerson, L. A., & Reaser, J. K. (2002). Biosecurity: moving towards a comprehensive approach. *BioScience, 52*(7), 593-600.

Michaelidou, N., & Dibb, S. (2006). Product involvement: An application in clothing. *Journal of Consumer Behaviour, 5*, 442-453.

Ministry of Agriculture and Forestry. (n.d.-a). Quarantine Declaration. Passenger Arrival Declaration. Retrieved October 5, 2006, from http://www.maf.govt.nz/quarantine/travellers/form.htm

Ministry of Agriculture and Forestry. (n.d.-b). Travel Agent Information. Retrieved October 6, 2006, from http://www.maf.govt.nz/quarantine/travel-agents/index.htm

Mitchell, A. A. (1979). Involvement: A potentially important mediator of consumer behavior. *Advances in Consumer Research, 6*, 191-196.

Mittal, B. (1995). A comparative analysis of four scales of consumer involvement. *Psychology and Marketing, 12*(7), 663-682.

Mittal, B., & Lee, M.-S. (1988). Separating brand-choice involvement from product involvement via consumer involvement profiles. *Advances in Consumer Research, 15*, 43-49.

Mittal, B., & Lee, M.-S. (1989). A causal model of consumer involvement. *Journal of Economic Psychology, 10*(3), 363-389.

Moorthy, S., Ratchford, B. T., & Talukdar, D. (1997). Consumer Information Search Revisited: Theory and Empirical Analysis. *The Journal of Consumer Research, 23*(4), 263-277.

Muncy, J. A., & Hunt, S. D. (1984). Consumer involvement: Definitional issues and research directions. *Advances in Consumer Research, 11*(193-196).

Murdoch, H., Bewsell, D., Lourey, R., & Kaine, G. (2006). *Understanding people's response to biosecurity regulation*. In *Decision making in uncertain times: 3rd National Conference on Risk Management, Auckland, 17-19 October 2006.* Wellington, New Zealand: The New Zealand Society for Risk Management.

O'Cass, A. (2000). An assessment of consumers product, purchase decision, advertising and consumption involvement in fashion clothing. *Journal of Economic Psychology, 21*(5), 545-576.

Obermiller, C. (1995). The baby is sick/the baby is well: A test of environmental communication appeals. *Journal of Advertising, 24*(2), 55-70.

Park, H. S., Levine, T. R., Westerman, C. Y. K., Orfgen, T., & Foregger, S. (2007). The effects of argument quality and involvement type on attitude formation and attitude change: A test of dual-process and social judgment predictions. *Human Communication Research, 33*(1), 81-102.

Parliamentary Commissioner for the Environment. (2002). *New Zealand under siege: a review of the management of biosecurity risks to the environment*: Parliamentary Commissioner for the Environment.

Perrings, C., Williamson, M., Barbier, E. B., Delfino, D., Dalmazzone, S., Shogren, J., Simmons, P., & Watkinson, A. (2002). Biological invasion risks and the public good: An economic perspective. *Ecology and Society, 6*(1), art1.

Petty, R. E., & Cacioppo, J. T. (1990). Involvement and persuasion: Tradition versus integration. *Psychological Bulletin, 107*(3), 367-374.

Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research, 10*(2), 135-146.

Pieniak, Z., Verbeke, W., Scholderer, J., Brunsø, K., & Olsen, S. O. (2008). Impact of consumers' health beliefs, health involvement and risk perception on fish consumption: A study in five European countries. *British Food Journal, 110*(9), 898-915.

Poiesz, T. B. C., & deBont, C. (1995). Do we need involvement to understand consumer behavior? In *Advances In Consumer Research, Vol Xxii* (Vol. 22, pp. 448-452).

Priluck, R., & Till, B. D. (2004). The role of contingency awareness, involvement, and need for cognition in attitude formation. *Journal of the Academy of Marketing Science, 32*(3), 329-344.

Pryer, J. A., Vrijheid, M., Nichols, R., Kiggins, M., & Elliott, P. (1997). Who are the 'low energy reporters' in the dietary and nutritional survey of British adults? *International Journal of Epidemiology, 26*(1), 146-154.

Putulan, D., Sar, S., Drew, R. A. I., Raghu, S., & Clarke, A. R. (2004). Fruit and vegetable movement on domestic flights in Papua New Guinea and the risk of spreading pest fruit-flies (Diptera: Tephritidae). *International Journal of Pest Management, 50*(1), 17-22.

Ratchford, B. T. (1987). New insights about the FCB grid. *Journal of Advertising Research, 14*(4), 24-38.

Ratchford, B. T. (2001). The Economics of Consumer Knowledge. *Journal of Consumer Research, 27*(4), 397-411.

Rauniyar, G. P., Whyte, C. F., Winton, A. S. W., & Cheyne, J. (2000). Effectiveness of border strategies at modifying aircraft passenger behaviour: How good are we at containing biosecurity risks? *Primary Industry Management, 3*(2), 36-42.

Rauniyar, G. P., Winton, A. S. W., Whyte, C. F., & Cheyne, J. (1999). *Assessment of the efffectiveness of border strategies at modifying aircraft passenger behaviour. MAF Policy project no. MSH 301*.

Rhodes, S. D., Bowie, D. A., & Hergenrather, K. C. (2003). Collecting behavioural data using the world wide web: considerations for researchers. *Journal of Epidemiology and Community Health, 57*, 68-73.

Richins, M. L., & Bloch, P. H. (1986). After the new wears off: The temporal context of product involvement. *Journal of Consumer Research, 13*, 280-285.

Richins, M. L., Bloch, P. H., & McQuarrie, E. F. (1992). How Enduring and Situational Involvement Combine to Create Involvement Responses. *Journal of Consumer Psychology, 1*(2), 143-153.

Rimal, R. N., & Real, K. (2005). Assessing the perceived importance of skin cancer: How question-order effects are influenced by issue involvement. *Health Education and Behaviour, 32*(3), 398-412.

Roser, C. (1990). Involvement, attention, and perceptions of message relevance in the response to persuasive appeals. *Communication Research, 17*(5), 571-600.

Roth, M. S. (1994). Enhancing consumer involvement in health care: The dynamics of control, empowerment, and trust. *Journal of Public Policy and Marketing, 13*(1), 115-132.

Rothschild, M. L. (1984). Perspectives on involvement: Current problems and future directions. *Advances in Consumer Research, 11*, 216-217.

Salmon, C. T. (1986). Perspectives on involvement in consumer and communication research. In B. Dervin & M. Voigt (Eds.), *Progress in the communication sciences* (Vol. 7, pp. 243-268). Norwood, NJ: Ablex.

Sansgiry, S. S., Cady, P. S., & Sansgiry, S. (2001). Consumer involvement: Effects on information processing from over-the-counter medication labels. *Health Marketing Quarterly, 19*(1), 61-78.

Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing response rates and nonresponse bias in web and paper surveys *Research in Higher Education, 44*(4), 409-432.

Sherif, C. W., Sherif, M., & Nebergall, R. E. (1965). *Attitude and attitude change. The social judgement-involvement approach*. Philadephia and London: W.B. Saunders Company.

Shiv, B., Edell Britton, J. A., & Payne, J. W. (2004). Does elaboration increase or decrease the effectiveness of negatively versus positively framed messages? *Journal of Consumer Research, 31*(1), 199-208.

Smitz, P., Ashworth, S., & Bedford, N. (2004). *Australia*. Australia: Lonely Planet.

Stephenson, B. P., Gill, G. S. C., Randall, J. L., & Wilson, J. A. (2003). Biosecurity approaches to surveillance and response for new plant pest species. *New Zealand Plant Protection, 56*, 5-9.

Storey, T., & Clayton, B. (2002). Biosecurity law in New Zealand. *New Zealand Journal of Forestry, 47*(2), 28-30.

Suckling, D. M., Jang, E. B., Holder, P., Carvalho, L., & Stephens, A. E. (2008). Evaluation of lure dispensers for fruit fly surveillance in New Zealand. *Pest Management Science, 64*(8), 848-856.

Sutinen, J. G., & Kuperan, K. (1999). A socio-economic theory of regulatory compliance. *International Journal of Social Economics, 26*(1/2/3), 174-193.

Takemura, K. (1994). Personal involvement, task complexity, and the decision making process. An information search analysis. *Japanese Psychological Research, 36*(1), 41-48.

Tatem, A. J., & Hay, S. I. (2007). Climatic similarity and biological exchange in the worldwide airline transportation network. *Proceedings of the Royal Society B: Biological Sciences, 274*(1617), 1489-1496.

Thompson, L., Stenekes, N., Kruger, H., & Carr, A. (2009). *Engaging in biosecurity: Literature review of community engagement approaches*: Bureau of Rural Sciences.

UMR Research Limited. (2004a). *Protect New Zealand. General public. A benchmark quantitative survey. Unpublished report*: Ministry of Agriculture and Forestry.

UMR Research Limited. (2004b). *Protect New Zealand. Travellers. A quantitative study. Unpublished report*: Ministry of Agriculture and Forestry.

Van Kenhove, P., Wijnen, K., & De Wulf, K. (2002). The influence of topic involvement on mail-survey response behavior. *Psychology and Marketing, 19*(3), 293 - 301.

Verbeke, W. (2008). Impact of communication on consumers' food choices. *Proceedings of the Nutrition Society, 67*(3), 281-288.

Verbeke, W., & Vackier, I. (2004). Profile and effects of consumer involvement in fresh meat. *Meat Science, 67*(1), 159-168.

Vermeir, I., & Verbeke, W. (2006). Sustainable food consumption: Exploring the consumer "attitude - behavioral intention" gap. *Journal of Agricultural and Environmental Ethics, 19*(2), 169-194.

Vitousek, P. M., D'Antonio, C. M., Loope, L. L., Rejmánek, M., & Westbrookes, R. (1997). Introduced species: A significant component of human-caused global change. *New Zealand Journal of Ecology, 21*(1), 1-16.

Webb, M. (1995). The Biosecurity Act 1993 and the "thin green line". *New Zealand Law Journal, December*, 395-400.

Weinstein, N. D., & Sandman, P. M. (1992). A model of the precaution adoption process: Evidence from home radon testing. *Health Psychology, 11*(3), 170-180.

Whyte, C. F. (2005). *Science and biosecurity - monitoring the effectiveness of biosecurity interventions at New Zealand's borders*. In *Science and security - informing NZ: Royal Society conference, Wellington, 17 November 2005.* Wellington, New Zealand: The Royal Society of New Zealand.

Wiese, W. H. (2008). Farm dogs and other dogs of agriculture *Journal of Agricultural & Food Information, 9*(1), 77 - 91.

Willard, G., & Gramzow, R. H. (2008). Exaggeration in memory: Systematic distortion of self-evaluative information under reduced accessibility. *Journal of Experimental Social Psychology, 44*(2), 246-259.

Winter, S. C., & May, P. J. (2001). Motivation for Compliance with Environmental Regulations. *Journal of Policy Analysis and Management, 20*(4), 675-698.

Zaichkowsky, J. L. (1985). Measuring the involvement construct. *Journal of Consumer Research, 12*(3), 341-352.

Zaichkowsky, J. L. (1986). Conceptualizing involvement. *Journal of Advertising, 15*(2), 4-14.

Zaichkowsky, J. L. (1994). The personal involvement inventory: Reduction, revision, and application to advertising. *Journal of Advertising, 23*(4), 59-70.

Appendix 1

Research & Innovation Office

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Canterbury 8150

HUMAN ETHICS COMMITTEE

Application No: 2007-48 **27 November 2007**

Title: **Determining Travellers' Response to New Zealand Biosecurity**

Applicants: **Denise Bewsell**

The Lincoln University Human Ethics Committee has reviewed the above noted application.

Dear Denise

Thank you for your detailed response to the questions which were forwarded to you on the Committee's behalf.

Having read your responses, I am satisfied on the Committee's behalf that the issues of concern have been satisfactorily addressed.

I am pleased to give final approval to your project and may I, on behalf of the Committee, wish you success in your research.

Yours sincerely

Professor Sheelagh Matear
Acting Chair, Human Ethics Committee

PLEASE NOTE: The Human Ethics Committee has an audit process in place for applications. Please see 7.3 of the Human Ethics Committee Operating Procedures (ACHE) in the Lincoln University Policies and Procedures Manual for more information.

cc: Dr Hugh Bigsby (Commerce)
Prof Ross Cullen (Commerce)

Appendix 2: Further discussion on methods for obtaining travellers responses to New Zealand biosecurity

Several methods for obtaining individuals' response to New Zealand biosecurity requirements were considered and attempted during the course of the research outlined in this thesis. Travellers, i.e. air passengers arriving into New Zealand, were an obvious target for this research. MAFBNZ was approached to determine whether it was possible to obtain access to the arrivals hall to hand out surveys, or to interview newly arrived travellers. It became apparent that, because of the increasing interesting in biosecurity and tourism research, there were a number of individuals and organisations who were seeking permission to obtain data from travellers in the arrivals hall at international airports. Although a meeting and subsequent discussions were held with MAFBNZ, they were reluctant to add another researcher to that list and declined a request for access to individuals in the arrivals hall. This is going to be an issue for future research as there are practical limits to the number of people that can be in the arrivals hall over any one time period.

Another avenue considered, for obtaining responses to New Zealand biosecurity requirements from travellers, was approaching an airline for permission to hand out surveys on the plane. Putulan, Sar, Drew, Raghu, & Clarke (2004) surveyed passengers on domestic flights in Papua New Guinea (PNG) in order to determine the risk posed by the movement of fruit and vegetables. Many fruit and vegetables are hosts for fruit fly, a significant pest in PNG and other parts of the world. Passengers were asked to indicate their origin and destination, occupation, purpose of travel, whether they were carrying fresh produce, and if so details of this (Putulan *et al.*, 2004). Approximately 40 % of the passengers surveyed were carrying fruit or vegetables representing a considerable domestic biosecurity risk (Putulan *et al.*,

2004). However, one of the researchers indicated that approaching airlines in PNG in order to obtain permission to distribute the surveys onboard aircrafts had initially failed (A. Clark personal communication, October 26, 2006). This part of the project had been put on hold. Then, a new scientist was recruited to the project. This researcher had a relative within one of the domestic airlines and was able to use this contact to persuade them to undertake distribution of the survey, allowing the team to complete the project (A. Clark personal communication, October 26, 2006). From discussion with MAFBNZ it appeared that any approach to airlines for the research outlined in this thesis would need to be either via MAFBNZ or an independent contact. As MAFBNZ had declined our request for access to the arrivals hall, and neither I, nor my supervisors, had any potential contacts within an airline that flew to New Zealand we did not pursue this option any further.

A third method for obtaining responses to New Zealand biosecurity requirements from travellers was to approach a travel agent and obtain agreement to distribute the survey to clients who had booked an overseas trip. This option was also investigated. A travel agency was approached and permission was granted to distribute the survey via the travel agent located at Lincoln University. A short description of the survey and a link to it was added to the travel agent's email signature. However, this method did not result in any responses to the survey. It was not clear whether there was little interest in the survey or if the number of people emailed was too small. In the interests of time, this method was discontinued. A convenience sample of students and staff at Lincoln University was then selected as the target audience for the research.

Appendix 3: Detailed results

Table 4.6a: Further details of countries respondents had visited in the last year

	Sample 1	**Sample 2**	**Total**
Australasia/Pacific	24	57	81
Asia (countries mentioned below)	13	22	35
Cambodia		*1*	
China	*2*	*7*	
Hong Kong	*1*	*1*	
Indonesia	*1*	*1*	
Japan	*2*	*1*	
Laos,		*1*	
Malaysia	*2*	*4*	
Mongolia	*1*		
Nepal	*1*		
PNG		*1*	
Singapore	*1*	*5*	
Sri Lanka	*1*	*2*	
Taiwan		*1*	
Thailand	*3*	*2*	
Vietnam		*3*	
Asia not specified	*1*	*1*	
Europe	13	16	29
North America	10	14	24
UK	5	11	16
Latin America	1	3	4
Africa		2	2
India		2	2
Other (countries mentioned below)		2	2
Antarctica		*1*	
Russia		*1*	
Not answered	2	1	3